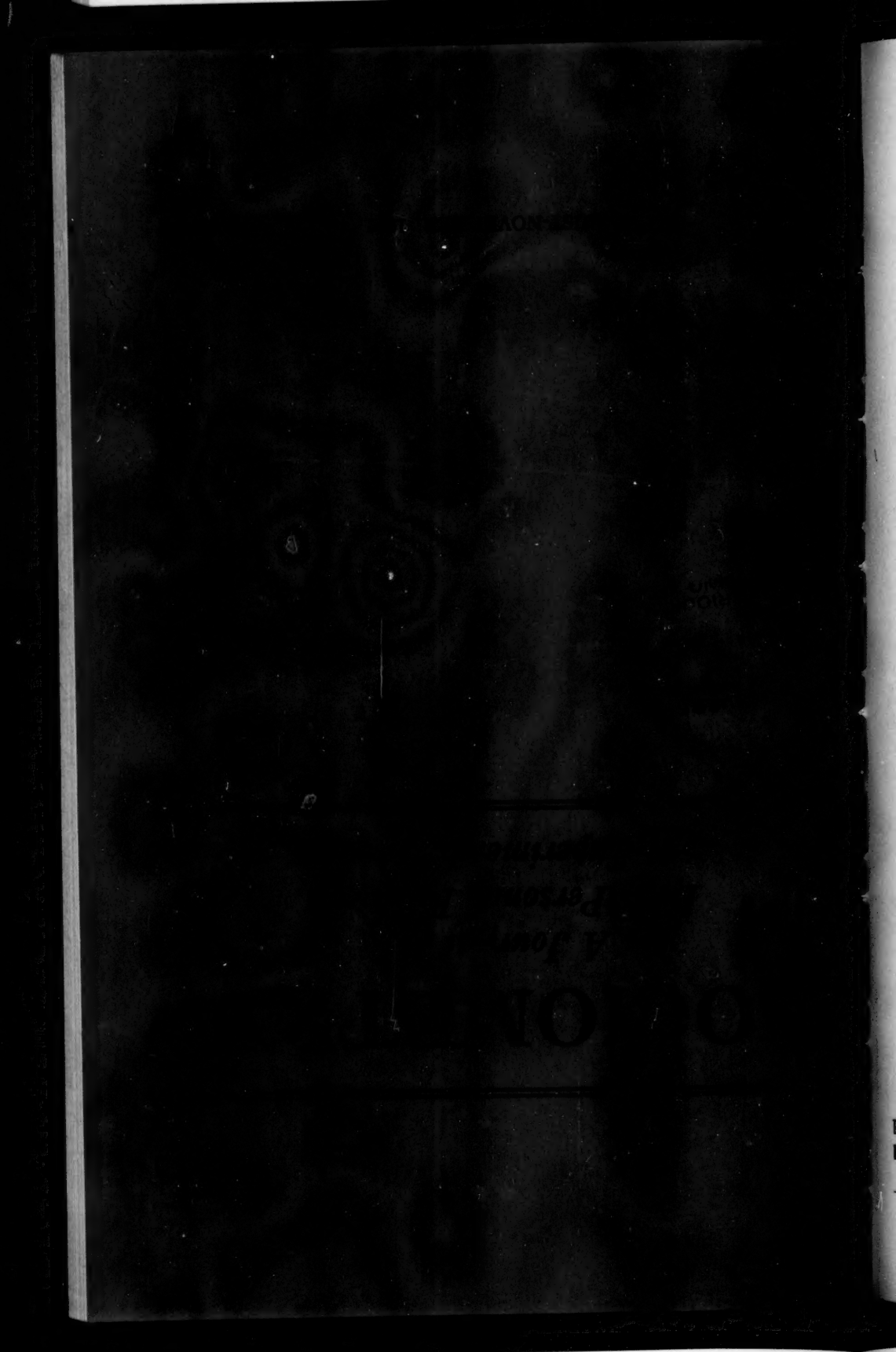

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A SOCIOMETRIC INVESTIGATION INTO THE DEVELOPMENT OF AN EXPERIMENTAL MODEL FOR SMALL GROUP ANALYSIS*

LEWIS YABLONSKY
New York University

INTRODUCTION

This paper presents an empirical exploration into the analysis of small groups. The focus of the experiment is methodological; an attempt at the development of an experimental model. The model attempts to perform small group analysis *without* the use of an observer or participant observer, but through enlisting the aid of the group itself for "group self-analysis."

This study proposes that small group analysis, performed in this manner, obtains data which are relevant towards getting an important vantage point of small group structure and process. This is a preliminary attempt which is organized towards sharpening a model design for small group analysis from the "inside."

Three experiments were performed with small groups. The first two were pre-tests for developing the research model applied to the last group. The first two experiments, being test runs, are not presented here. The experiments were carried out in the following order: (1) A study of a group of six women strangers at the Moreno Institute. (2) A study of a group of six delinquent boys held in custody at a juvenile delinquency detention facility. (3) The final, most extensive study was carried out at a state reformatory for women with a group consisting of six staff officers.

There were no specific hypotheses being considered in the experiments. The studies were heuristic; hypothesis producing rather than hypothesis testing. Their focus was the developmnt of an analytic research method for small groups. Based on the final experiment and its analysis, this research is considered by the writer to have advanced the successful development of an adequate research model which may be applied to the structure process analysis of small groups.

---

* This experimental model, designed for the analysis of small groups, is an extension of a methodological research area originated by Dr. J. L. Moreno. Further research in this area is in process under the sponsorship of the Moreno Institute. The author is appreciative of the invaluable advice extended by Dr. Moreno, Moreno Institute and Dr. E. Borgatta, Harvard University in the development of this project. He also wishes to acknowledge the cooperation of Dr. W. Warner, Chairman, and Dr. H. Ashley Weeks, Research Director, Department of Graduate Sociology, New York University.

Reformatory Officer Experiment*

I. *Description of Experiment*

The experiment was carried out at a reformatory for women. The experimental sample was composed of a group of six cottage officers. The sample was selected from the staff of an institution for the reason that within a group of this type, working and living together there is represented many interesting and varied groupal relationships.

In the experiment they formed two sub-groups (3 each). Any references made to these sub-groups will be specified as Sub-group A (Subjects #1, #2, #3) and sub-group B (Subjects #4, #5, #6).

The sequential ordering of the experiment divided itself into three parts. The description of the experiment will follow these three phases:

A. The Warm-Up Period
B. Dyadic Interaction Period
C. Sociometric Assessment Period

A. *The "Warm-Up"** Period*

1. The experiment was opened by the director through introducing himself to the group and then in turn meeting each group member individually. This initial phase tended to have a "warming" effect on the experimental situation.

2. Following the opening phase the director presented a comprehensive explanation of the basis, methods and purpose involved in the experiment. The group was informed that the experiment was essentially concerned with the development of a method for small group analysis.

3. The director was familiar with the functions connected with reformatory officer's job as he had personal experience in this area. He proceeded to point out in what ways small group analysis was an essential function of the group's job. This tended to actively involve the group, as the experiment was to deal with a subject which was close to their interests and might prove of some value to the group members personally.

---

* This presentation focuses on the experimental model applied to this group. It does not purport to offer data which differs significantly from the possibilities of chance. Validation of the data would require the application of this model to the same group a statistically significant number of times.

** For a theoretical discussion of this technique see J. L. Moreno, *Psychodrama* Vol. I (Beacon, N. Y., Beacon House Inc., 1946), especially Section IV and *Who Shall Survive?*, revised edition, 1952, by the same author. The warm-up technique was first introduced by Moreno in *Application of the Group Method to Classification*, 1932.

4. It was then clearly pointed out that although the experiment might not directly be of current value to the group, the development of a scientific method for small group analysis might ultimately be useful for their purposes.

5. A further attempt to obtain the group's confidence was made by assuring them that there were no "tricks" or "indirect" methods to be employed in the experiment. They were told that they would be informed as completely as possible on all of the reasons for each part of the experiment as it evolved.

6. The director further assured the group of the importance of their knowing what was "going on" as they (the group) were to become "co-researchers" in the experiment. This tended to further involve and interest the group.

7. The director openly discussed with the group an important requirement of the experiment which was connected with their revealing reactions at various points which would be their "innermost thoughts." The importance of this data for the research was stressed.

8. In return for this level of information the group was (from all outward appearances) thoroughly assured that their responses would be held in the most complete confidence of the research director from the other group members. The group's affirmation that they were prepared to "co-operate" to this extent with the experiment was requested and received.

9. At this point the group appeared "warmed-up" and prepared to proceed further into the experimental processes.

An adequate "warming-up" process is the foundation of a successful group experiment of this type. An attempt is made to actively: (1) Create a "warm" feeling between all interacting members of the group. (2) Interest and involve the group into the experimental situation. (3) Have the experiment contribute something of personal value for all members of the group.

Based upon the responses of the group at this point in the experiment it was felt that this vital criterion had been adequately fulfilled.

B. Dyadic Interaction Period

1. The women were paired off into three separate parts of the room seated in a dyadic "face-to-face" position of chairs. (#1 with #2, #3 with #4, #5 with #6)

2. The subjects were instructed that they were to be seated in this position with the woman opposite them for a five minute period.

3. They were then informed that during the five minute period they might talk about anything they desired. It was left completely up to the

group to structure their interaction from that point. The situation attempted to allow for a maximum amount of freedom on the part of the subjects for determining the interaction which took place.

4. When they were instructed to begin, the group immediately burst into an intense flow of conversation.

5. After this initial interactive period, each member of the group was given an individual writing position. Each of the subjects then received a large card.

6. They were instructed to record on the card the following information under three indicated headings:*

a. As closely as they could recall the topical content of the interaction they had just had with another. The group's version of the interaction which had taken place.

b. As close as possible a reproduction of all the thoughts the subject had experienced during the interaction period. A record of the thought level which existed for the interactor during the interaction session.

c. The "honest" reaction felt by each interactor toward the other with whom they had just interacted. What they *"really"* thought of the other.

7. The subjects were than placed into another interactive dyadic situation each with another member of the group. After this period they were again returned to their writing positions. This went on through a total of five dyadic interaction periods. Each subject within the group interacted with each other subject and then recorded the required data.

C. Sociometric Assessment Period

1. The group was "warmed-up" to the sociometric assessment through offering the group the idea of "taking an accounting of their human relationship bank account in the same manner in which they take an accounting of their financial position." In this case they were to "substitute debits and credits with attractions and rejections," which existed in relation to the other members of the group.

2. The director then pointed out the importance of evaluating attrac-

* This data was not casually requested. The director stressed and reiterated the necessity of recording "true" responses as the entire value of the experiment depended on their "real" reactions. Based on the data obtained the writer believes that the data was quite close to being the "true" reactions of the group.

tions and rejections toward others not in general terms but in relation to specific important action criterion. That is, if the group was asked to make a selection of "with whom they would most like to brand a cow" their reactions would tend to be highly incoherent as they would have little, if any reference to that particular situation. However, if they were asked to respond to "with whom in the group they would most prefer sharing the same room," their responses to this important "life situation" criterion would tend to be a more clear-cut reaction as this is an important situation into which they could project themselves more readily.

3. The group was further informed regarding another important consideration in the assessments of attractions and rejections. This was in relation to the fact that an individual may select another individual for working with, yet may reject that same individual for such an activity as recreation. They were therefore informed that in order to obtain a meaningful evaluation of the group's structure it would be necessary to obtain their responses to a number of what was called *"life situations."*

4. The following action criterion were considered to represent the basic important "life situations" essential for assessing this group's structural organization:

(a) Working with on duty, usual routine.
(b) Working with when trouble starts.
(c) Live with (share room).
(d) Recreation (go into town, movie, shop, etc.).
(e) Chat with socially in officer's lounge.
(f) Discuss a personal problem.

5. A sociometric test was administered using the *"life situation"* criterion. Attraction and rejections were recorded in response to these vital action criteria.*

6. Following these reactions a "sociometric perception test"** was administered. Using the same "life situation" criterion, the subjects were asked to give their conception of "whom they thought selected and rejected themselves." Specifically they were requested to attempt putting themselves

* An active attempt was made on the part of the director to "realistically" project the group members into each of the "life situations" before the subjects recorded their responses. The subjects were not passively asked to respond to, for example, "with whom would most like to work when trouble starts?" An attempt was made to "warm-up" the group to some specific situations which they could each personally associate with the criterion.

** See Moreno, J. L., "Sociometry in Action", SOCIOMETRY, Vol. 5, 1942, pp. 301-5.

in the place of each other member of the group and determine as best they could who selected and rejected them in terms of the important *"life situation"* criterion.

II. *The Analysis*

A. Group Personality Evaluation

The group personality of a subject in this experiment is all of the reactions which have been recorded in response to the direction—"Write down exactly what you think of the other person with whom you were just talking." The accuracy and the "honesty" of each subject's reaction to the other depended on the extent to which the group members were "warmed-up" to give their response.

The reactions which the subjects gave toward the others "on the spot" is not necessarily representative of a "total reaction"; however, based on the response obtained, many of the reactions could easily be extended as an overall opinion of how the individual felt toward the other. For example, "She is a woman of such mental limitations, and I always wonder how she could be her age, rear a family and know no more of life than she does. Such a fuddy-duddy." A statement such as the foregoing might be interpreted as a general reaction of #6 to #4 which might be extended to indicate a "total" reaction.

Following will be presented examples of the "group personality" for subjects #1, #2, and #3. It is the record of data recorded at the end of each interaction dyadic session.

Subject #1

Responders

#2 "My partner is a very interesting person. She is a very level headed, understanding person. Always willing to help give advice where needed. Also a very excellent worker. I value her opinion very highly."

#3 "She is a very capable and understanding person, is very well liked by all for her good judgment, very helpful in every respect."

#4 "She manages a very large group of girls very well, but being slightly deaf, is sometimes misunderstood. She is extremely interested in her cottage and her girls."

#5 "This woman is the type who is old not only in years. To me she is "hard", lacks tolerance, and is unfit to guide others."

#6 "So difficult to make her understand as she's hard of hearing. Impatient with her because she won't acknowledge her deafness and use a hearing device. She actually misses so much."

Possible Interpretations

Sub-group A who worked with #1 reported that she was "capable", "an excellent worker", "value her opinion", "good judgment", "helpful in every respect", "understanding" etc. These were the reactions of the group who knew and worked intimately with #1.

On the other hand those who did not work closely with her stated: "slightly deaf", "sometimes misunderstood", "hard", "lacks tolerance", "unfit to guide others", "impatient with her deafness" etc.

Although the group seemed split in their interpretations related to #1, it seems meaningful that the group who works in close proximity with this woman did not seem to be aware of her "deafness." They probably understand and can communicate with her reasonably well, as they make no "issue" of this disability—which is so annoying to the others. In addition her co-workers apparently admired her greatly as a worker.

SUBJECT #2

Responders

#1 "I think very good. Is a very nice person to work with. Very capable."

#3 "A very fine person who has done plenty of social welfare work, very capable, very understanding."

#4 "Very sincere in her work and takes a big interest in the place she works. At times she is a little too excitable, but is generally ok."

#5 "I like this person very much and feel she is superior to many white supervisors in that she seems emotionally mature. I find all contacts with her stimulating. I always feel I must 'be on my toes' with her."

#6 "As I consider her a personal friend, complete rapport is always established. We enjoy a sense of humor completely satisfactory to both."

Possible Interpretations

From all indications #2 was held in high esteem by all members of the group. According to group consensus #2 was "nice to work with", "very capable", "understanding", "sincere in her work", "stimulating", "emotionally mature", "good sense of humor". As will be more intensively investigated in a further section this positive reaction to #2 made her a sociometric star in many activity areas selected by the group.

SUBJECT #3

Responders

#1 "Is a nice person to live with, agreeable. Cooperates in our work together."

#2 "This person is very easy to work with. She seems to be one of the fine people I have met on the farm."

#4 "I feel that the person I talked with is a very hard worker and sincerely honest in doing the best she can for the girls."

#5 "I like this woman but I feel that she isn't too aware of the problems which exist here."

#6 "One person *irks* me all the time I am with her. She can't be honest with anyone and I'm confused on what I think while I talk to her and what I think now on what I write. Also how honest has each one of these women been."

Possible Interpretations

For the most part the women seem to indicate a positive reaction to #3. Such comments as "nice to live with", "agreeable", "cooperative", "hard worker" etc. On the other hand there were some extremely negative reactions by #5 and #6. Subject #5 didn't believe that #3 "was aware of the problems which exist here." Subject #6 appeared to be completely upset by having to talk with #3. At her "thought interaction level" she commented, "she's the crudest gossip I know and I hope to God I never grow to be like her."

Again the reactions tend to indicate that those people (#5 and #6) who have less contact with #3 than her co-workers (#1 and #2) reacted much more unfavorably to this person.

B. Interpersonal quotient

Feeling affectivity towards another resulting from one or many encounters is not a "one-way street." Action-reaction is reflected in feelings toward others which are necessarily integrated with how the other responds. People oftentimes tend to like those who like them. In the following analysis an attempt will be made to assess the reciprocity of feeling indicated by the group.

Having six subjects each react to each, presents fifteen possibilities of dyadic assessment. Each individual had an opportunity to reflect feeling about five others; as there were six subjects, this came to a sum total of thirty reflections of feeling tone.

Out of the thirty possible individual reflections, how many were reciprocated? The feeling tones which each presented as existing towards the other (response to "how do you *really* feel about the other?) will be summarized into reactions as follows. *Positive will equal P; negative will equal O; indifference or neutrality will equal N; indeterminate will equal X.* For example, if a subject states, "I am sincerely fond of the person", this will be considered positive and will be represented by a P. If subject states,

"One person who irks me all the time I am with her", this would be considered negative and represented by an O. If the subject states, "Pleasant to talk with" or "My opinion of my partner is neutral", this would be considered a neutral reaction and represented by an N. An X will equal a doubtful category (not readily interpreted). Table I presents this interpretation of the data.

TABLE I

DYADIC INTERPERSONAL RELATIONSHIP

Interpersonal Reactions

Subject #	Reaction to Other		Subject #
1	P	P	2
3	P	P	4
5	P	P	6
4	P	O	6
2	P	P	5
1	P	P	3
3	P	X	5
2	P	P	6
1	N	X	4
2	P	P	3
1	P	O	6
4	N	N	5
2	O	P	4
3	P	O	6
1	N	O	5

ANALYSIS INTERPERSONAL QUOTIENT*

Total Group Interpersonal Quotient equals .47
Subgroup A (#1, #2, #3) Interpersonal Quotient equals 1.0
Subgroup B (#4, #5, #6) Interpersonal Quotient equals .33
Cross-group Interpersonal Quotient equals .33

* Interpersonal Quotient equals $\frac{\text{Number of Paired Reciprocal Relationships}}{\text{Total Number of Relationships}}$

C. Analysis of Interaction Process

Before proceeding into the analysis and interpretation of the small group process which took place, it is important to clearly describe the specific forms of interaction which were analyzed here in process. Social interaction may be defined as existing in two forms: (1) on the overt and (2) on the covert level. Both levels of interactivity were the focus of this analysis.

The overt level of interaction will be referred to in the following analysis as "manifest lvel." This level is the subject's reproduced record of the

topical content of the interaction they had with another during a dyadic period. It was recorded by the subject immediately after the interaction session. They were requested to set it down to correspond as closely as possible to what actually took place. The "manifest level" is the subject's "personal" recorded interpretation of the interaction.

The covert level of interaction will be referred to in the following analysis as "thought level"*. This level is the subject's reproduced record of the personal thoughts they had during the dyadic period. The group was requested to record the thoughts which they experienced during the interaction session as closely as it was possible for them to recall. The analysis will be organized toward answering the following questions:

(a) What were the basic interaction topics?
(b) Were the interactors in agreement or not in their interpretations of the manifest level interaction?
(c) What was the relationship between each actor's manifest and thought level interpretations?
(d) Was there any similarity between the thought level interaction of the dyadic interactors?

Only a portion of the data collected will be illustrated in this presentation; however, Table III will have a detailed analysis of all the data in this area.

TABLE III
MANIFEST AND THOUGHT LEVEL INTERRELATIONSHIPS

	Interactors Manifest Interaction Relationship		Individuals Manifest and Thought Level Relationship		Interactors Thought Level Relationship	
	No. Cases	*%*	*No. Cases*	*%*	*No. Cases*	*%*
Agreement	13	87	14	47	4	27
Non-agreement	2	13	16	53	11	73

Note: These data are interpreted in terms of what was recorded by the interactors.

* It is the writer's opinion that a record of the "thought level" of interactivity is essential for obtaining data which supplies a "total" version of the group's interaction. This level of analysis, however, is difficult to obtain as it is highly personalized. It is not at all accessible to "observer" reporting. The only ones able to supply data on the "thought level" of interaction are the interactors. This only becomes possible if they are successfully and adequately "warmed-up" to becoming participating "co-researchers" in and for the experiment.

PROCESS ANALYSIS EXAMPLES

	#1	#2
Manifest Level.	"The convention in Chicago. Mrs. Roosevelt. Vacation time. One girl unruly when asked to come to roll call. Planning for the circus,* the hot weather, and general cottage problems."	"Cottage discussion—about girls keeping order in cottage. One girl not willing to do things asked of her. Decided to leave her alone. Summer vacation, where spending it and program. Convention. Mrs. Roosevelt—A new job application."
Thought Level.	"About—to go on duty. Anxious for the welfare of our group when away. About Rehearsal."	"Will I make my partner understand my feeling about her cottage. Can I interest her in my trend of thought. Can I interest her enough to draw out a good conversation."

Possible Interpretations

(a) The main topics discussed were: Convention, Mrs. Roosevelt, cottage problems, vacation and the weather.

(b) These two interactors were almost in perfect agreement as to their manifest interaction.

(c) Subject #1 seemed to have some relationship between her manifest interactivity and her thoughts. Subject #1 apparently had no difficulty within the situation. Subject #2 reflected a considerable disparity between what she was talking about and what she was thinking. She seemed rather anxious as to, "can I interest her in my trend of thought, draw out a good conversation, will I make her understand my feeling about her cottage."

(d) Although there was consensus on the manifest level, there was no consensus at all on the thought level of interaction.

	#3	#4
Manifest Level.	"About girls that cause disturbances with the group they are working with."	"We were discussing the problem of girls who are efficient in their work, but who are resented by the other girls, because of their trying to boss the other girls, and also the ones who stir up trouble while trying to do this job."

* The circus and rehearsals referred to are connected with an entertainment program which was being prepared for the weekend.

Thought Level.	"Thinking what measures we could take to avoid these things that happen each day."	"My mind seemed to be going back to several girls who came under this class and how I tried to get them straightened out for their own good and for the good of those who associate with them."

Possible Interpretations

(a) The main topic discussed was problem "girls."

(b) Both of the interactors were in fairly close agreement as to the manifest interaction level.

(c) Both actors were apparently concentrating on what they were talking about as their thought levels were in accord with what was verbalized.

(d) The thought levels of both of the actors was quite similar.

(e) Possibly due to the nature of the subject being discussed and its importance for both of the interactors there was a high level of mutuality and reciprocity on all levels for this dyadic group.

	#5	#6
Manifest Level.	"We discussed what constituted a vacation and the advisability of doing several things—taking several short excursions—or a longer one and spending a week or so at a quiet resort. Also, if a supervisor is justified in losing her temper when tried too severely by an inmate and whether an inmate should receive a demerit for her anti-social speech."	"Personal vacation plans. Tentative arrangements for same. Reference to an exhibition of a mild temper tantrum I indulged in in the cottage."
Thought Level.	"I wished I could make my partner realize how wonderful it is to be physically able to do work one likes—I can't forget two years I spent as an invalid. I felt I did not object to not having a "vacation" this year. I longed to have her find the satisfaction I find in my work.	"The reservation that no matter what vacation I undertook might not come within an enforced budget, necessary for the first time in many years. Also curious to know if my companion thought my temper flare was not edifying, feeling myself it was very undignified."

Possible Interpretations

(a) The main subjects discussed were, vacation, problem girls.

(b) Both interactors were in fairly close agreement as to what was discussed.

(c) Although subject #5 had traces of the manifest level incorporated within the thought level, for the most part the subject was thinking about something else. Subject #6 had some connection between the thought and manifest level. Subject #6 wondered what #5 thought of the "temper flare" with an inmate.

(d) The similarity on the thought level was related with #6 wondering how #5 felt about her and #5 in a way envying #6.

	#4	#5
Manifest Level.	"We discussed the futility of the new slips, they are trying out. Each girl is given a slip when she leaves for her assignment, with the time on. When she arrives at her assignment the time is supposed to be checked again, etc. through the day! The idea is very good, but is far from effective, as yet. The different clocks vary and the girls also can lose their slips, and change the time put down. It is supposed to keep them from loitering, but will have to have many changes yet, to do any good."	"We discussed the new slips for checking girls in and out for work assignments. My partner felt the idea had been conceived to keep girls from loitering. I feel it was put in effect as a measure to help prevent runaways."
Thought Level.	"I was thinking how different supervisors misconstrue the meaning of a pattern and it is very hard, if everyone does not have the same ideas about certain rules."	"Going through my mind was a thought of amusement at the whole idea of these "slips". I thought I'd laugh and make the best of the extra work for I know these impractical ideas always die a natural death."

Possible Interpretations

(a) The main topic discussed was a new method of control of inmates from running away or loitering.

(b) Close agreement as to what was talked about, in the main, yet a disagreement as to meaning of the subject matter.

(c) Both actors were concerned with the manifest interaction on the thought level.

(d) Some similarity on the thought levels of the interactors.

	#3	#6
Manifest Level.	"Convention, farm, circus, general trend of conversation."	"My companion gossiped about her former ass't super in another institution. Gave a complete resume of her background inside of 1½ minutes. Cottage activities. Heat! Lots of empty talk."
Thought Level.	"About tomorrow what reaction the heat would have on the women in the kitchen, about the food, etc."	"She's the crudest gossiper I know and I hope to God I never grow like her. Politeness must be maintained under all circumstances and I smile a yes and no in the right places."

Possible Interpretations

(a) The main topics discussed were the convention, the institution, general gossip.

(b) A fairly close agreement as to manifest levels indicated.

(c) Hardly any relationship between manifest and thought level for both subjects.

(d) No relationship between interactors on thought level.

D. Group Structure

The "life situations" syndrome of the experimental group of cottage officers was used as the referent for determining this group's structural relationships. All of the essential "everyday" activities were assessed in terms of their attraction-rejection components.

This experiment considered the following criterion as comprising the essential "life situations" which indicated this group's structure:

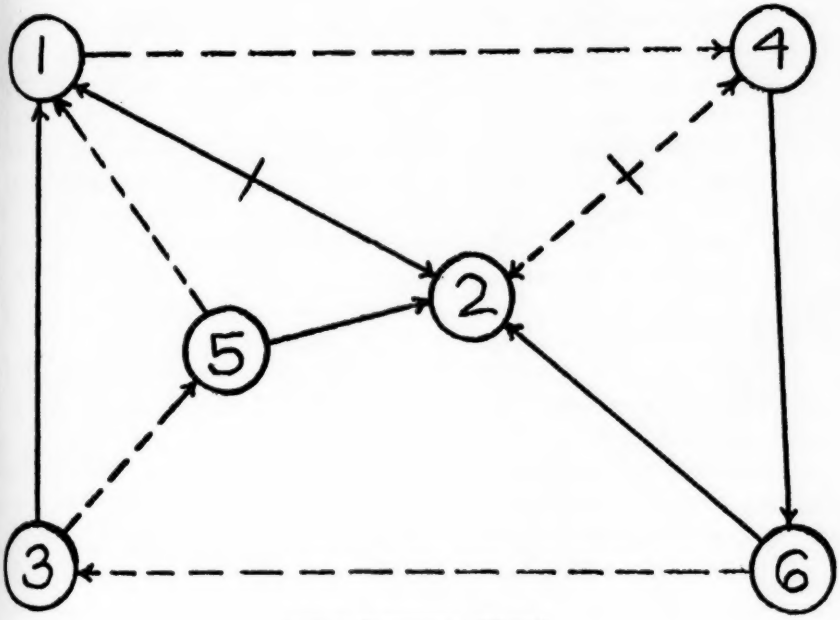
1. Work (normal routine and in an "emergency").
2. Live with (share same room).
3. Recreation (go to town, movie, etc.).
4. Social interaction (chat with).
5. Discuss a personal problem.

The responses to these criterion was fairly immediate. Each group member could quickly assess the direction in which their feeling flowed in terms of each of the criterion. These criterion were not new to the group members; they had and were operating in terms of them daily.

In the following analysis each of the "life situation" criterion which organized the important structural relationships of the group was assessed

and interpreted individually. The final analysis will be in terms of all of the life-situation criteria as a composite.

A primary implement which will be used in the analysis is what may be called "choice-rejection status."* It is a simple tool for rank-scaling each of the group members in terms of the rejections and selections they received. Other than this, the analysis and inferences will be related to the relationship patterns indicated by the sociograms.



ACTION CRITERION: "WORK"

* The choice-rejection status Index is determined as follows:

C equals $\frac{\text{Number of persons chosing subject}}{(N-1)}$

R equals $\frac{\text{Number of persons rejecting subject}}{(N-1)}$

C-R Status equals C minus R.

N equals number of subjects. The rationale for (N—1) is that the subject cannot choose or reject theirself.

Criterion: "Work With (Usual Routine)"

Analysis

1. Members of sub-group A(#1, #2, #3) received five out of the six possible choices, indicating that the group's members were more sought after. They received two out of the six rejections; none however, from within.
2. All of the rejections went out to members of the other sub-group. There was no rejection of close work associates.
3. There were no mutual rejections and only one mutual attraction (#1 and #2).
4. The total group's integration was low, with three complete isolates. (not chosen).
5. In this activity, the group appeared quite scattered as a unit. There was a cleavage in terms of close work associates. Sub-group A was well integrated within itself; its choices were internalized (100%) and its rejections were externalized (100%). Sub-group B reaches out to A in their selections.

Possible Inferences

People who work together tend to select close associates and reject relatively out-group people for work; however, when a sub-group is not unified they will reach for others.

The working relationships selected are positively related to the interpersonal quotient in terms of the sub-groups. Sub-group A (quotient 1.) was more unified than Sub-group B (.3 quotient).

CHOICE REJECTION STATUS

Status	*Subject #*	*Quotient*
1	2	.4
2	6	.2
2	1	.2
3	3	—.2
3	5	—.2
4	4	—.4

Criterion: "Work With (When Trouble Starts)"

There are minor changes reflected in considering "working with normal routine" and "working with when trouble starts"; however, it seems meaningful that there were any changes. The changes are summarized as follows:

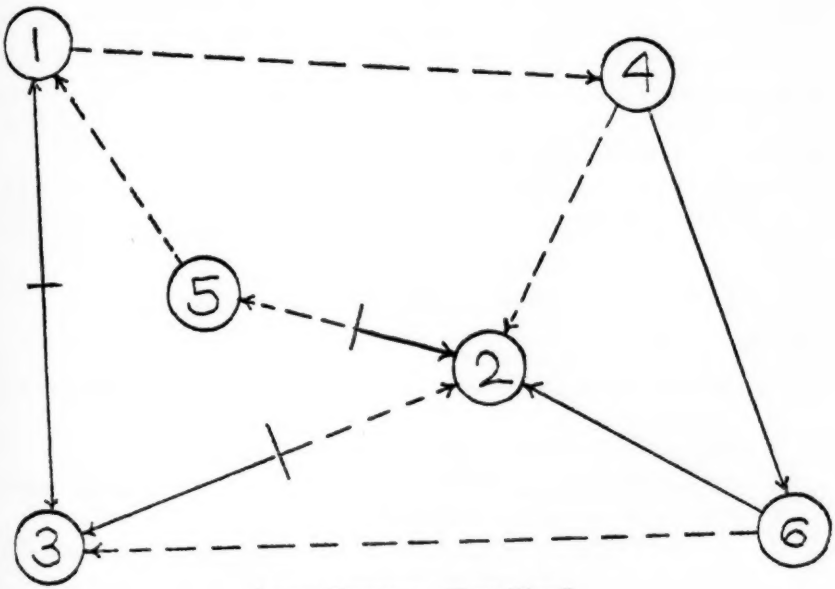
Selector	"Work With Normal Routine" *Choice*	*Reject*	"When Trouble Starts" *Choice*	*Reject*
#1	—	—	—	—
#2	1	—	6	—
#3	—	—	—	—
#4	—	2	—	5
#5	—	—	—	—
#6	—	3	—	4

Note: — equals no change.
There were two shifts in terms of rejections and one related to choice.

Criterion: "Live With"

Analysis

1. The group as a unit was quite unintegrated in their selections in terms of this criterion. There was only one mutually paired selection



ACTION CRITERION: "LIVE WITH"

(#1 and #3). There were two pairs, where subjects who were selected, in turn rejected. (#3 chosen by #2, rejected #2; #2 selected by #5 rejected #5).

2. There seemed to be a low degree of group cohesion.
3. Five out of the six possible choices went toward Sub-group A. All of Sub-group A choices were internalized.
4. Rejections were scattered; however #2 received two of them.

Possible Inferences

There was a considerable shift in direction from the "work" criterion to "living with" criterion.

The most popular worker choice (#2) fell considerably in rank in terms of "living with". Subject #2 is Negro and this may be the explanation.

Again there were indications of the solidarity and cohesion of Sub-group A as compared to Sub-group B.

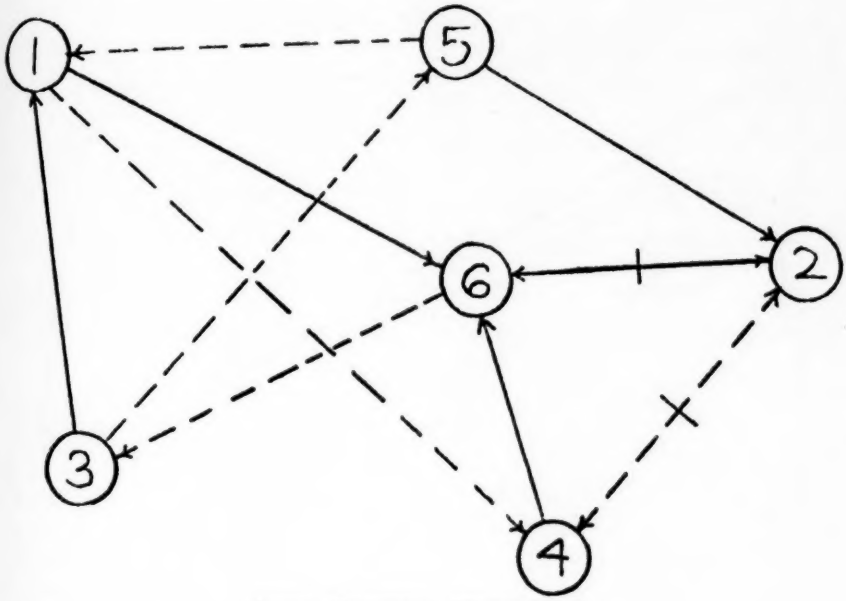
CHOICE REJECTION STATUS

Status	*Subject #*	*Index*
1	6	.2
1	3	.2
2	1	.0
2	2	.0
3	5	—.2
3	4	—.2

Criterion: "Recreation (Go Into Town, Shop, Movies Etc.)"

Analysis

1. Subject #6 had three choices in this area; possibly indicating a "group specialist."
2. Sub-group A rejected none of their own members.
3. Subject #4 was rejected by out-group but not by in-group; again referring to proximity consideration.
4. A mutual rejection (#2 and #4), and a mutual selection (#2 and #6) indicating some "awareness" of other.



ACTION CRITERION: "RECREATION"

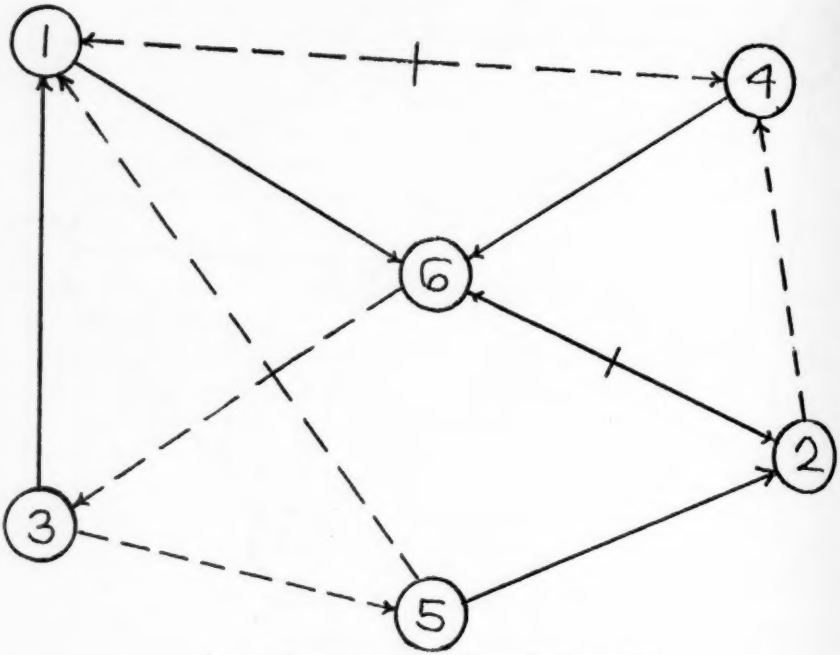
Possible Inferences

The group as a unit was more "aware" of the actual relationships which existed in terms of this criterion. This was indicated by the reciprocal selection and rejection which existed. There was less scattered wasted motion or direction.

It is interesting that number six apparently a "specialist" according to this criterion (received three selections) as compared to "work" selections, which were probably made more in terms of personality compatibility.

CHOICE REJECTION STATUS

Status	*Subject #*	*Index*
1	6	.6
2	2	.2
3	1	.0
4	3	—.2
4	5	—.2
5	4	—.4



ACTION CRITERION: "CHAT WITH IN LOUNGE"

Criterion: "Chat With In Lounge"

Analysis

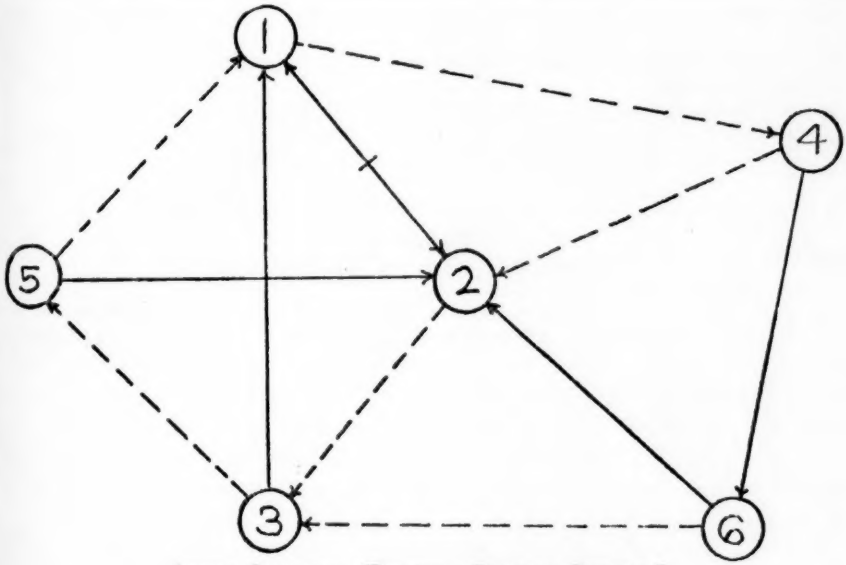
1. The group structure in terms of this criterion was not very different from what it was in terms of the "recreation" criterion.
2. Subject #2 and #6 were a reciprocal pair. The "leaders" selected each other
3. Subject #6 is apparently a group specialist in social-recreation activity, receiving half of the possible selections in both areas.
4. All of Sub-group A's selections were externalized, except one (#3 to #1).

Possible Inferences

Apparently recreation and social interaction selections were quite fused. Work criterion, however, presented another possibility.

CHOICE-REJECTION STATUS

Status	*Subject #*	*Index*
1	6	.6
2	2	.4
3	1	—.2
3	3	—.2
3	5	—.2
4	4	—.4



ACTION CRITERION: "DISCUSS A PERSONAL PROBLEM"

Criterion: "Discuss A Personal Problem With"

Analysis

1. There is no "group expert" for the discussion of a personal problem; however, #2 who was second in terms of "chatting with" moved up to first position. Subject #6 dropped to second from first in this area.
2. Sub-group A tends to internalize all of their choices on this criterion, and Sub-group B reaches out to A for this activity.

Possible Inferences

There appears to be a meaningful change of selections when the criterion is switched from "chat with" to "discussion of a personal problem." One subject (#6) who was a star for the criterion "chat with" fell to second place when it became more personalized.

The better integrated group, sub-group A pulled more inward when it came to the more personalized criterion.

CHOICE-REJECTION STATUS

Status	*Subject #*	*Index*
1	2	.4
2	1	.2
2	6	.2
3	4	—.2
3	5	—.2
5	3	—.4

TABLE IV

GROUP CHOICE-REJECTION STATUS INDICES

C-R Status	*Subject #*	*% Of Total (C+R) Selections Received*	*C-R Index*	*Number Received*	
				Choices	*Rejections*
1	6	16	2.2	11	0
2	2	27	2.0	15	5
3	1	22	.0	8	8
4	3	10	—.6	2	5
5	5	10	—1.4	0	7
6	4	15	—2.2	0	11

SUB-GROUPING INDICES

	Choice-Rejection Index	*Internalized*		*Externalized*		*Total Number Received*	
		Rejections	*Choices*	*Rejections*	*Choices*	*Choices*	*Rejections*
Sub-Group A —	1.4	11%	73%	89%	27%	25	18
Sub-Group B —	—1.4	11%	33%	89%	66%	11	18

Total Living Situation

All of the activities which have been used as criterion as a unit are representative of the total *"life situation"* of this group. These activities tend to form the most important day to day situations. In this section all of the activities will be taken as an integrated whole and analyzed in these terms.

TABLE V
TOTAL LIFE SITUATION SOCIOMATRIX

Selected	#1	#2	#3	#4	#5	#6
Selectors						
#1		111	1	xxxxxx		11
#2	11		1x	xxxx	x	111
#3	111111	x			xxxxx	
#4	x	xxxx			x	111111
#5	xxxxxx	111111				
#6		111111	xxxxxx	x		

1—Choice.
x—Rejection.

Possible Analysis

1. Subjects #6 and #2 were apparently the "stars" of the group. In addition, they tended to form a clique (#6 selected #2 five times and was responded to three times by #2).
2. Subject #2 was apparently the most "provocative" member of the group, receiving the greatest number of selections. Although #6 has the highest status within the group in terms of selection rejection, she apparently isn't as "interrelated" with group members, ranking third in this area.
3. Subjects #5 and #4 may be considered as isolated rejects, neither receiving any choices.
4. The group is extremely low in terms of mutual attractions. There were many choices going out which were unreciprocated.
5. The group indicated a low degree of sensitivity. There were many rejections and choices going out which were not known to the subjects toward whom they were directed.

6. Based on the data it appeared that there was a distinct cleavage between sub-groups A and B.
7. Sub-group A appeared to be a more "introverted" group. (73% of choices internalized. Sub-group B, on the other hand, tended to be an "extroverted" group (33% of choices internalized).
8. Both groups, significantly, externalized most all of their rejections. (89% of all possible rejections going out toward the other sub-group).

E. Sociometric Perception Analysis

This data was obtained by having the group respond to the request to record their interpretation of who selected and rejected them for each specific "life situation" criterion. In this manner each subject's sociometric perception of the other's flow of feeling (tele) towards themselves was indicated in terms of the *"life situation"* criterion of the group.

TABLE VI
SOCIOMETRIC PERCEPTION: CHOICES

Subject #	*"I select" "Selects me" Relationship (%)*	*Accuracy of Conception of Selection of Self By Other (%)*
1	100	50
2	33	83
3	100	17
4	100	0
5	100	0
6	100	50

Possible Analysis

1. Most all of the group members believed that those whom they selected reciprocated by in turn selecting them. Five out of the six group members believed that 100% of their choices were mutually received.

This tends to indicate that people "like those" who "like me". Based on this inference it might be stated that individuals go in a direction in which they feel that they will be received.

The only group member who didn't believe all of her choices were reciprocated was #2. This subject indicated that only one-third of her choices would be reciprocated.

2. In terms of each subject's conception of who selected them; the

group as a whole was quite inaccurate. The group member who was remarkably accurate in the conception of her "social world" was #2. This tended to tie in with #2's high degree of relationships within the group. (#2 had more selections and rejections than any other member of the group, 15).

3. The group members' accuracy in selecting those who selected themselves appears to be directly related to their "choice-rejection status" within the group. Subjects #2, #6 and #1 who ranked in the upper half of the status positions were more accurate than the lower status ranked members in their perception of their "social environment."

4. Subjects #3, #4, #5, who were at the bottom of the status-rejection status scale in about that order were highly inaccurate in their evaluation of those who chose them. The three as a group picked one correct selection out of eighteen. Subjects #4 and #5 who were at the bottom of the status scale, did not make one accurate selection as to who chose them, they were completely wrong.

Possible Inferences

The group as a unit believed that those whom they selected in turn selected them. Individuals apparently "feel" toward those whom they believe reciprocate and feel toward them. Whether individuals tend toward others whom they perceive "selects them"; or whether they are "hopeful" that those whom they select respond is not established.

The group as a unit appeared to be quite inaccurate in their ability to ascertain who "selected them." Their perception of their social environment appeared to be quite "low." (The group as a unit was 33% accurate. It seems logical to infer that a group's perceptivity of each other's conception of themselves would be a function of group cohesion and integration. A group of people who were all "aware" of their social environment of "the others" would probably be a more coherent effectively operating unit. The apparent lack of coherence in this area seems to tie in with the general fragmented pattern of this group.

It seems meaningful that there was a direct relationship between choice-rejection status and accuracy of prediction of selectors. A possible hypothesis that those people who are most desirable have a greater degree of empathy might be inferred.

The subjects who were most chosen, in turn were those who were most aware of their "actual" relationships. They apparently were more capable of putting themselves into the position of the other and seeing themselves through the "eyes" of the other. On the other hand the individuals who

were low on the status scale were practically "blind" in their conceptions of the feeling which flowed in their direction.

Popularity of an individual seems to be directly tied in with an individual's ability to see himself as others do. Possibly this factor enters directly into their relationship with the other and they are better equipped for acting within the relationship. The ability to empathize appears to be an important factor toward making an individual more desired as a "social partner."

TABLE VII
SOCIOMETRIC PERCEPTION: REJECTIONS

Subject #	*"I reject" "Rejects me" Relationship (%)*	*Accuracy of Conception of Rejection of Self By Other (%)*
1	83	17
2	50	50
3	50	00
4	66	66
5	100	00
6	83	00

Possible Analysis

1. All of the group considered at least half of those whom they rejected, in turn rejected themselves. The only group member (#5) who believed that all of the people whom she rejected, in turn rejected her was completely inaccurate in the conception of who rejected her.

Although the strength of "reciprocal rejection" is not as strong as "reciprocal attraction" it still tends to indicate that people choose and reject those whom they believe reciprocate these feelings.

2. There was no particular relationship in this area between acccuracy of interpretation of another's feeling and choice-rejection status. In fact the lowest status subject (#4) was fairly accurate in her conception of rejection of herself (66% accuracy). On the choice perception #4 was completely inaccurate (00). Perhaps rejected people are more acute at perceiving those who reject them, whereas, they are relatively "blind" in their determination of who chooses them.

Possible Inferences

The relationship between an individual's rejections and those whom he thinks rejects him is about 65%. The group believed that about two-thirds

of those whom they rejected, in turn rejected them. Possibly people tend to believe that although they dislike someone the person whom they dislike doesn't necessarily feel that way toward them. On the other hand, when they chose another, they believed almost 100% that the other also chose them in turn.

People may not be as interested in how another responds to their negative flow of feelings toward another; however, when they "go out" toward another they believe it is reciprocated. Whether they believe they are responding to a positive flow of feeling or whether they cognize (almost necessarily) that their feeling is responded to is undetermined.

The group members were highly inaccurate in determining who rejected them. Perhaps this is a function of a defense mechanism against rejection. A subject may not want to recognize who really rejects him; possibly he would prefer believing that those whom he rejects in turn reject him.

The group was highly incoherent in determining the feeling which flowed in their direction. This negative perceptivity of the others feeling toward themselves is in accord with the general fragmented scattering of attractions and rejections which were unreciprocated. The cohesion and integration of the group structure as reflected by the "sociometric perception" analysis appears to be quite low. The group members appear to have a personalized conception of the group system relationships. This lack of accurate perception for assessing the feelings of others fits into the group's general structural pattern.

Theoretical Considerations

A. Actor-Oriented Interaction

The experiments in this presentation were designed for the purpose of developing a research technique which would tend to uncover the structure and process of the "social group." The experimental organization was designed toward being a catalyzer of actor-oriented interaction. The groups in the experiments were given relative freedom to develop their interactivity with a minimum of outside control (other than the experimental situation). It was group process which came easily for the group members, as each individual was the exclusive author of his interaction in relationship to the other.

The group determined the interaction, which might have taken any of a number of forms. As it developed, each interactive dyad created a form of interaction which seemed "natural" to and for the participating members at the time of their interactivity. To a great extent, even the necessary

imposition of the experimental organization was diminished in its affecting the interaction; this was accomplished through an adequate warming-up process.

The group in this experiment were not committed to what may be called "manipulative-oriented" interaction, which here refers to experimental groups who are studied in terms of how the group performs a specific task, solves a problem or operates in accordance with a pre-determined hypothesis.

The induction of specific manipulative-oriented elements by the experimenter is warranted when the focus of the small group experiment is upon how a specific small group is organized in terms of performing the specific function designed by the experimenter. Oftentimes, however, in small group experimentation the analysis of how the group operates in terms of a limited area of their interaction is extended as an analysis of the group as a complete social system.

In these experiments the activity was primarily actor-oriented. There were limited manipulative-oriented factors operating. The test situation was designed for calling forth group "self-expression." It was organized for eliciting an important part of the subject's "social reality." The group was allowed to determine what was important from their vast potential of social responses which the experiment attempted to spontaneously activate in a relatively pure actor-oriented test situation.

B. Group-Centered Research

Analysis of group phenomenon under laboratory conditions presents the problem of creating conditions under which the significant factors of the group system emerge. This dimension is developed through the use of a dynamic warming-up process which attempts to bring the subjects to a state where they are interacting "'spontaneously". The design of this approach attempts to create "contrived-spontaneity" for the purpose of obtaining more meaningful reactions and responses which might give insight into the group structure-process in action.

The groups in these experiments were not pushed into an interactive situation for which they were "cold". They became participants in the interactive dyads to the extent that they felt prepared. There was no rigidity within the experimental design to push them beyond the point for which they were ready to act. They were allowed to interact with the other within the dyadic situation to the degree that the interaction created by the group members seemed appropriate.

As Moreno states "Inducing a group for research reasons to warm-up

in a direction for which they are not ready or which is contrary to their inclinations, induces an element of artificiality into the experiment which cannot be ironed out adequately by inferential or logical argumentation".* This approach attempted to be sensitive in all of the experiments in not pushing the group into action in a direction which they were not adequately warmed-up.

Further, the experiments were pre-organized to allow for a maximum of malleability to the requirements of the experiment, as they were fused with the immediate research potential of the group. "Sociometric procedure has to be shaped in accord with the momentary potentialities of the subjects so as to arouse them to a maximum of spontaneous participation and to a maximum of expression. If the sociometric procedure is not attuned to the momentary structure of a community, limited or distorted knowledge of it will be obtained".**

In these experiments, the research moved with the group, as it was the experimental "center". The organization of the experiment was modified at many points to adapt to the "momentary structure of the group"..

C. Co-Researchers

Recruiting the important potential of the group to what was in effect self-analysis was an important technique which was fully utilized in the experiments. There was not only one researcher within the experimental situation—all of the individuals participating were given research status. The director assumed the role of a catalyzer of the vast potential of research energy which existed within the group. Through the use of the warming-up process and adapting the experiments to the group—all of the participants appeared to become actively involved in the experiment. All became co-researchers operating from a most advantageous position for each of the participants to perform their research—each became a researcher of himself. The experiment was not dependent on the interpretations of outside observers or participant observers, it utilized researchers who were more familiar with the data than anyone could be—the creators of the data.

It was not found necessary to perform small group analysis from a distance. The research can get as close to the units of interaction as the actors themselves—the creators of the data. The co-researchers connected with the experiment (who composed the experiment) were utilized in their

* Moreno, J. L. *Experimental Method, and The Science of Society* (Beacon: Beacon House Inc., 1951) p. 23.

** *Ibid.*, p. 134.

role as researchers operating as close as possible to the position of the origination of the data which they themselves created.

Most small group analysis techniques are dependent upon the interpretations of given units of interactivity by the outside or participant observer; "objectivity" on the part of the researcher is considered an asset. Although this factor may be desirable in certain types of research, in small group analysis the "distant" observer runs the risk of detaching himself completely from the relevant interaction of the group. Research of this "distant" type places the observer in a position where his interpretation of the relevant units of behavior may become his personalized record of an interactive system's process and structure which has "out-distanced" him. Observer small group analysis runs the risk of not "moving with the group", an essential for continual verification of the analysis made.

The observer is oftentimes in the position of a "voyeur" who may attribute and record interaction more in terms of his own personal conception of the interactivity, than in terms of the group member's personal interpretation of the group interaction.

For example, the outside observer may view a problem-solving group of six, busily (manipulatively) working out an advertising campaign. They might record such "action" units as A gives help to B, C is neutral etc. If the outside observer was "moving with the group", attempting to arrive at their interpretation of the interactivity—he might find that A is trying to get B fired, and possibly that C, who is sitting "neutral" is the power pulling the strings behind the entire group process—with a movement of his eye or hand. The latter would be the "microscopic" level of small group analysis which would be obtained through warming the group up toward a spontaneous state and then obtaining self-analysis by the group in action process.

It is not necessary to restrict the vast possibilities of small group analysis to relying on outside or even participant observers. Methods may be developed which actively enlist the members of an experimental group as co-researchers. *Enlisting the important potentiality of the elements being studied as aids in the research is a possibility which exists only in the social sciences.* Small group analysis methods can make greater use of this important advantage. This design attempted to fully utilize this factor by systematically enlisting the members of the experimental groups in supplying an important vantage point for small group analysis.

D. Action Research

Group activity may be considered at various levels of becoming manifest, comparable to a motion picture sequence. Conceptually with a specific act as the frame-of-reference the action unit may be divided into stages of (1) preparation to act (warming-up), (2) defining the situation and then (3) the act. (Of course there are many intermediary steps). All of these stages are worthwhile areas for small group analysis.

If the analysis focuses upon interactivity prior to action—an individual's predisposition to act, or if the analysis is concerned with the recapitulation of what took place within the action situation, it is a perfectly legitimate approach; however to call these methods "action-research" is a semantic, as well as a material error. The closest research can come to group interaction analysis that is action-oriented, in the real sense of the word, is to obtain the data in process, as close to the moment of its creation, as possible —not before or not after it has taken place.

In this approach, after the group was "warmed-up" and apparently interacting "spontaneously", the subjects were enlisted as co-researchers to give their conception of the interactivity, "on the spot". Obtaining data on small group interactive process, even a few hours after it has taken place—may dilute their accuracy; due to the psychological forces of memory or the distortion of the interpretation through autistic (sometimes research) needs.

This method recognizes that group-process (at the present stage of experimental approach) cannot be recorded at the exact birth of a unit of action; however, the data logically appear to be more accurate if they are obtained as close to their origination as possible. It is not denied that an "outside observer" could view the action as it *manifested itself*; however, this would not accurately get at the birth of the action—the only one capable of offering this data is the creator of the action, the actor. This method attempted to enlist the aid of the actors in giving to the research a report of their action as close as possible to the "moment" it took place without depending on the vagaries and distortion with which Post, or observer reporting may become diluted.

In this approach the analysis of the small group was obtained by the use of a research process which utilized the potential of "research energy" available as close to the creation of the data as possible. Each researcher was stationed as close to the fountainhead of the group activity upon which he was the best expert to report, as he created—through his spontaneous interaction. The data for the analysis of the small group are "live data", recorded in "status nascendi", as close as possible to their point of creation.

FACTORS OF THE TELE: A PRELIMINARY REPORT

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I.

The term "tele",[1] as applied in the sociometric literature, is generally understood to designate the attitude of acceptance or rejection which the individual projects toward the various members of his group. More specifically, it could be described as the emotional disposition underlying the individual's spontaneous choice of a helpmate in some activity which is to be shared. The tele is measured objectively, of course, in the sociometric test, and its precise meaning is largely dependent upon the situation in which the test is made.

Although it has been emphasized that the sociometric choice should be spontaneous, this does not imply that it is independent of any determinable causes in the history of the person who chooses or in the social background of the group. Quite the contrary, the problem of relating the tele, as observed in the test, to psychological and social factors in the individual and the group has been central in sociometric research. Notable examples are Moreno's studies of the effect of age differences upon the sociometric choices of children,[1] Criswell's studies of race-cleavage in the classroom,[2] and the investigations centering upon the bases of the sociometric choice in personality reported by Jennings.[3]

The present study is also concerned with the analysis of the tele into its principal social and psychological variables, in so far as they may be determined with accuracy. Primarily, the discussion is one of method, and the experiment which will be reported is intended as an illustration of method and not as a basis for a general statement about the composition of the tele. Needless to say, any factor analysis of one small group would have a very large sampling error. For certain establishment of factors, a large number of such groups would have to be used.

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[1] Moreno, J. L., *Who Shall Survive?*, Beacon House, New York, 1934; 2nd ed., 1952.

[2] Criswell, J. H., "A Sociometric Study of Race Cleavage in the Classroom", *Archives of Psychology*, Number 235, New York, 1939.

[3] Jennings, H. H., *Leadership and Isolation*, Longmans, Green and Company, New York, 1950. 2nd edition.

II.

Data for the study were obtained from a situation developed by the writer while teaching a ninth grade physical science class in a private secondary school. The children were to work in groups on projects connected with a unit on astronomy. They were superior science students and, on the whole, were genuinely interested in the assignment. After a preliminary announcement in a previous period, the children were given the following instructions:

"As I (the writer, R. D. B.) promised yesterday, I am going to give you an opportunity to choose the persons with whom you would like to work on your astronomy project. I am going to give each of you a sheet of paper on which you will find the names of everyone in the class listed in alphabetical order. (Showing one of the papers.) You see, there are sixteen names on it. In front of each name there is space in which to write a number. I want you to put a number from one to fifteen in each of these spaces in order of your preference for each of the persons as a partner on your astronomy project. When you come to your own name, cross it out so that I may know to whom the paper belongs. I realize that this is a private matter, and should be done privately; therefore, if any of you wish to move to other tables while filling in your sheets, please do so. When you are finished, fold the sheets in front of you, and I will collect them."

The children cooperated without objections or questions, and the sheets, when collected, were found to be properly completed. The preferences listed on these sheets were tabulated as shown in table 1.

The analysis of Table 1 will be made in the light of the following considerations: Let us suppose that each child in the group (in this case, the class) has a sort of continuum of attitude toward the rest of the group with respect to the choice which has been put before him. On this scale, there are those who are at the extreme positive (acceptance) end, and in the conventional sociometric test they would receive the first two or three choices. Others are on the extreme negative end and would receive the rejections on the usual test. In the middle are those who are regarded more neutrally, and their position on the scale approaches zero as the point of perfect indifference. For a given child, all other members of the group are represented at various points along this scale. When the child responds to the ranking test, he disregards the particular separation between persons on the scale and simply lists them from the positive end to the negative. Let us assume for the moment however that we know these real scale values, and let us

TABLE 1
PREFERENCE-RANKS

	*A/B	S	RA	JC	MD	GF	WG	JH	RJ	MK	AK	MP	AP	BR	VS	DT	WW	GZ
1.	RA	♂		13	7	3	2	9	10	8	1	14	12	4	11	5	6	14
2.	JC	♀	10		11	12	5	2	1	3	4	15	7	13	6	14	9	8
3.	MD	♂			Absent													
4.	GF	♂	1	13	4		5	6	7	10	9	2	12	11	8	15	3	14
5.	WG	♂	5	13	12	1		15	14	8	2	4	7	10	11	3	6	9
6.	JH	♀	5	6	12	8	13		3	1	7	9	2	14	4	10	11	15
7.	RJ	♀	13	5	14	7	6	2		1	12	11	4	15	3	9	10	8
8.	MK	♀	13	4	12	11	10	3	1		9	15	5	8	2	6	7	14
9.	AK	♂	1	12	4	3	2	11	10	9		15	14	8	13	6	5	7
10.	MP	♂	1	8	5	4	3	11	10	9	15		13	6	12	7	2	14
11.	AP	♀	14	8	7	13	6	2	4	1	5	15		9	11	10	3	12
12.	BR	♂	1	10	9	3	4	11	12	13	2	5	14		15	8	7	6
13.	VS	♀	12	5	13	7	6	3	1	2	11	14	4	9		15	8	10
14.	DT	♂	1	12	14	5	3	10	11	4	9	8	13	7	6		2	15
15.	WW	♂	3	8	2	5	1	9	10	7	15	4	6	14	13	12		11
16.	GZ	♂	1	6	10	2	9	13	11	8	3	7	14	12	15	5	4	

*Rows: A chooses B
Columns: B is chosen by A.

represent them as z_{ji}, where $_{ji}$ indicates that person j gives person i a preference score of z.

The complete set of preference scores for the class could then be written:

$$\begin{array}{ccccccc}
z_{11} & z_{12} & z_{13} & z_{14} & z_{15} & \cdots\cdots\cdots\cdots & z_{1N} \\
z_{21} & z_{22} & z_{23} & z_{24} & z_{25} & \cdots\cdots\cdots\cdots & z_{2N} \\
z_{31} & z_{32} & z_{33} & z_{34} & z_{35} & \cdots\cdots\cdots\cdots & z_{3N} \\
z_{41} & z_{42} & z_{43} & z_{44} & z_{45} & \cdots\cdots\cdots\cdots & z_{4N} \\
z_{51} & z_{52} & z_{53} & z_{54} & z_{55} & \cdots\cdots\cdots\cdots & z_{5N} \\
\cdot & \cdot & \cdot & \cdot & \cdot & & \cdot \\
\cdot & \cdot & \cdot & \cdot & \cdot & & \cdot \\
z_{N1} & z_{N2} & z_{N3} & z_{N4} & z_{N5} & \cdots\cdots\cdots\cdots & z_{NN}
\end{array}$$

where z when j = i is not defined, (because a person cannot choose himself) and N equals the number of persons.

Let us further assume that the preference score z for each person in the group is a linear function of m underlying variables. The scores for the i^{th} person, for example, could be written as follows:

$$\begin{array}{lcl}
z_{1i} & = & a_{11}F_{1i} + a_{12}F_{2i} \cdots\cdots + a_{1(m-1)}U_{(m-1)i} + a_{1m}U_{mi} \cdots\cdots \\
z_{2i} & = & a_{21}F_{1i} + a_{22}F_{2i} \cdots\cdots + a_{2(m-1)}U_{(m-1)i} + a_{2m}U_{mi} \cdots\cdots \\
z_{3i} & = & a_{31}F_{1i} + a_{32}F_{2i} \cdots\cdots + a_{3(m-1)}U_{(m-1)i} + a_{3m}U_{mi} \cdots\cdots \\
\cdot & & \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
\cdot & & \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
\cdot & & \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \\
z_{Ni} & = & a_{N1}F_{1i} + a_{N2}F_{2i} \cdots\cdots + a_{N(m-1)}U_{(m-1)i} + a_{Nm}U_{mi} \cdots\cdots
\end{array}$$

where (1) z_{ji} is the preference score that person j gives to person i, (2) F_{ki} and U_{ki} are the part scores of person i on variable k, (3) F represents those factors which enter into the choices of more than one person and U represents those factors which are unique to one person and includes errors which might reduce the reliability of z, (4) a_{jk} is the coefficient which determines the extent to which factor k influences the choices of person j, and (5) N represents the number of persons in the group.

It would be of interest to explore the efficacy of such a representation for the tele by determining, for example, 1) how many choice-factors are present which are common to more than one chooser, 2) how important these factors are in determining the choices made by each child, 3) how much of each child's choice is attributable to factors common to other members of the group and how much is unique to the child himself, and 4) how each child is rated by the rest of the group with regard to the common factors. It would be of further interest to connect the factors with other information about the group and, hence, to give them social and psychological meaning.

These problems are, of course, precisely the sort for which factor analysis has been developed, and it is the purpose of this study, therefore, to illustrate the application of this technique to the data in Table 1.

III.

We must first have an index of the similarity between the preference-choices of each pair of individuals in the group. Ordinarily, this would be simply a matter of correlating the z scores. These we do not know, but we can step around this difficulty by using the method of rank-differences[4] to correlate the preferences just as they appear in Table 1.

An unavoidable error is introduced in this correlation because of the fact that a person cannot choose himself. In consequence, no two correlation coefficients will be strictly comparable since they will not be based upon choices for entirely the same people. Fortunately, the method of analysis which will be applied accounts for all the errors in the correlation coefficients and will enable us to proceed without further attention to this difficulty. Of the various factor analysis procedures which could have been applied to the data, the one chosen for illustration is the centroid method developed by Thurstone.

Row-by-row correlations were made for the data in Table 1, with the

[4] Cf., Guilford, J. P., *Psychometric Methods,* McGraw Hill Book Company, New York, 1936, pp. 339-42.

TABLE 2

PREFERENCE-CORRELATIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	RA	JC	MD	GF	WG	JH	RJ	MK	AK	MP	AP	BR	VS	DT	WW	GZ
1. RA																
2. JC	—.27															
3. MD																
4. GF	.02	—.12														
5. WG	.47	—.53		.03												
6. JH	—.21	.50		.05	—.11											
7. RJ	—.38	.66		—.32	—.27	.57										
8. MK	—.08	.57		—.34	—.58	.57	.62									
9. AK	.78	—.20		.27	.35	—.45	—.43	—.41								
10. MP	.53	—.47		.58	.22	—.10	—.41	—.34	.83							
11. AP	.25	.73		—.02	—.54	.22	.35	.62	—.06	—.21						
12. BR	.49	—.47		.40	.67	—.51	—.71	—.77	.68	.42	—.50					
13. VS	—.44	.80		—.15	—.54	.51	.82	.70	—.34	—.29	.68	—.64				
14. DT	.58	—.13		.57	.42	.13	—.01	—.07	.47	.70	—.01	.36	—.04			
15. WW	—.07	—.23		.59	.05	—.02	.03	—.46	.35	.66	—.14	.29	—.05	.26		
16. GZ	.47	—.33		.23	.66	—.12	—.41	—.60	.59	.55	—.34	.85	—.55	.48	.31	

Probable error of r when r = 0, is .19.

TABLE 3

SECOND FACTOR RESIDUALS

		RA	JC	MD	GF	WG	JH	RJ	MK	AK	MP	AP	BR	VS	DT	WW	GZ
1.	RA																
2.	JC	—.02															
3.	MD																
4.	GF	—.33	.03														
5.	WG	—.17	.01		.19												
6.	JH	—.16	.02		.11	—.24											
7.	RJ	—.11	.01		—.14	—.23	.12										
8.	MK	.22	—.14		—.15	.03	.07	—.03									
9.	AK	.25	.14		—.19	.06	—.26	—.05	.10								
10.	MP	—.05	—.19		.03	.17	.02	—.08	.02	.04							
11.	AP	.35	.13		—.01	.12	—.26	—.20	.00	.09	—.16						
12.	BR	—.04	—.21		.04	.08	.06	.04	.03	—.07	.18	—.02					
13.	VS	—.17	.05		.01	—.03	—.03	.11	—.09	.08	—.01	.01	—.11				
14.	DT	.13	—.08		.13	—.21	.12	.12	.08	—.13	—.01	—.10	.01	.05			
15.	WW	—.39	—.09		.28	.17	.04	.20	—.27	—.09	.14	—.13	.04	.15	—.15		
16.	GZ	.02	.18		—.16	—.19	.19	.04	—.05	—.02	—.09	—.01	—.17	.03	.04	—.05	

necessary adjustment for the omitted choices, and the following table of intercorrelations was prepared:

Columns 2, 6, 7, 8, 11, and 13 were "reflected" in order to reduce to a minimum the number of negative signs in the table. The first centroid factor loadings were calculated according to Thurstone's procedure[5] and the table of first factor residuals was prepared. The probable error of these residuals was about .25, suggesting that a second factor should be extracted. This was done, and the subsequent table of second factor residuals (Table 3) was found to have a probable error of about .15. Since the probable error of these residuals was less than that of the original correlations, the factoring was considered complete.[6]

The centroid factor loadings were rotated graphically, as shown in Figure 1, until a maximum of zero, or near-zero, loadings was obtained. The angle of rotation was taken to be 58° and the rotated factor loadings were computed and tabulated in Table 4.

In addition to the resolution of the preference-choices into common

TABLE 4
ROTATED FACTOR LOADINGS

			a_{j1}	a_{j2}
1.	RA	♂	.62	.03
2.	JC	♀	—.83	.00
3.	MD	♂	—	—
4.	GF	♂	.57	—.09
5.	WG	♂	.46	.47
6.	JH	♀	—.59	.08
7.	RJ	♀	—.78	—.08
8.	MK	♀	—.86	—.09
9.	AK	♂	.84	.04
10.	MP	♂	.94	—.10
11.	AP	♀	—.74	.21
12.	BR	♂	.70	.58
13.	VS	♀	—.91	.01
14.	DT	♂	.73	—.25
15.	WW	♂	.54	—.08
16.	GZ	♂	.71	.31

[5] Thurstone, L. L., *Multiple Factor Analysis,* University of Chicago Press, Chicago, 1949.

[6] For this test of when to stop the factor analysis, see Guilford, J. P., *op. cit.,* p. 494.

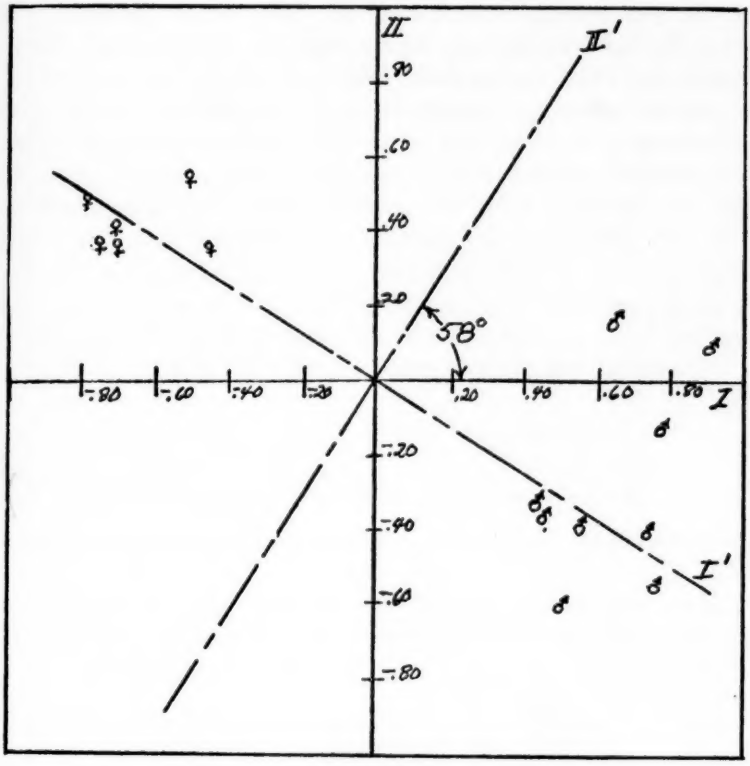

FIGURE 1
ROTATION OF THE CENTROID FACTOR PATTERN

factors, we may wish also to know how the various members of the group were scored by the rest of the group with regard to the common factors. Once the factor pattern has been decided upon, the factor scores can be estimated from the original table of scores. A number of methods have been proposed for this purpose: The one which will be used here is due to Ledermann[7] and is reported by Holzinger and Harman.[8]

In order to estimate the factors, it is necessary to have the original scores in their standard form. As pointed out above, we do not have these

[7] Ledermann, W., "On a Shortened Method for Estimating Mental Factors by Regression", *Psychometrika, 4,* (1939) 109-16.

[8] Holzinger, K. J. and Harman, H. H., *Factor Analysis,* University of Chicago Press, Chicago, 1941, pp. 278-83.

scores, but can only infer them from the ranks which the children have reported. If, however, we can assume that the qualities upon which the preferences are based are normally distributed among the members of the group, we can follow the example of Hull[9] and take the stimuli affecting the preferences to lie within plus or minus 2.5 sigma of the mean. Then, by marking off equal intervals of area under the normal curve, we can arrive at a scale for converting ranks to standard scores. This assumption is not perfectly defensible, since the number of persons being judged is small and the original scores are already known to contain two common factors, but it will be accepted here simply because nothing else is possible, and its justification left to its possible practical usefulness.[10] The following conversion scale was adapted from Hull's table:

Rank:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Score:	1.76	1.25	.95	.75	.51	.33	.17	.00	—.17	—.33	—.51	—.75	—.95	—1.25	—1.75

With this scale the ranks were converted to standard scores as shown in Table 5:

Ledermann's method was used to determine the regression equations for the two factors on the basis of the factor pattern shown in Table 4.

For factors one and two, respectively, these equations are:

$$F_{11} = .02z_{j1} - .08z_{j2} - +.03z_{j4} + .01z_{j5} - .03z_{j6} - .05z_{j7} - .10z_{j8} + .09z_{j9} + .30z_{j10} - .08z_{j11} + .03z_{j12} - .17z_{j13} + .06z_{j14} + .03z_{j15} + .03z_{j16}$$

$$F_{21} = -.14z_{j1} - .04z_{j2} - -.06z_{j4} - .25z_{j5} - .05z_{j6} + .04z_{j7} + .07z_{j8} - .01z_{j9} + .44z_{j10} - .25z_{j11} - .88z_{j12} - .12z_{j13} + .22z_{j14} + .04z_{j15} - .37z_{j16}$$

[9] Hull, C. L., *Aptitude Testing*, World Book Company, Yonkers, 1928, pp. 382 ff.

[10] There are two difficulties in this assumption. 1) The trait upon which judgments of choice are based may not be normally distributed. This is certain to be the case if the trait is a sexual distinction. For example, length of hair on the head in a group of men and women will be bimodially distributed—each mode characterizing a sex. 2) The choosers may not actually make implicit comparisons between all pairs of persons in the group. A girl who does not like boys, for example, may implicitly compare girls with girls before making a choice, then drop down the scale and compare boys with boys, but never compare a girl with a boy. The result would be a bimodial distribution of choices on the girl's subjective scale of choice.

In this study the effect of the scaling error has not seemed prohibitive. Only the average of the scores received by a given person have been used to characterize him, and, we believe, these averages suppress the scaling error and tend to order the members of the group with respect to the trait which the score measures.

TABLE 5*

PREFERENCE-RANKS AS STANDARD SCORES

		RA	JC	MD	GF	WG	JH	RJ	MK	AK	MP	AP	BR	VS	DT	WW	GZ
1.	RA		—95	17	95	125	—17	—33	00	176	—125	—75	75	—51	51	33	—176
2.	JC	—33		—51	—75	51	125	176	95	75	—176	17	—95	33	—125	—17	00
3.	MD																
4.	GF	176	—95	75		51	33	17	—33	—17	125	—75	—51	00	—176	95	—125
5.	WG	51	—95	—75	176		—176	—125	00	125	75	17	—33	—51	95	33	—17
6.	JH	51	33	—75	00	—95		95	176	17	—17	125	—125	75	—33	—51	—126
7.	RJ	—95	51	—125	17	33	125		176	—75	—51	75	—176	95	—17	—33	00
8.	MK	—95	75	—75	—51	—33	95	176		—17	—176	51	00	125	33	17	—125
9.	AK	176	—75	75	95	125	—51	—33	—17		—176	—125	00	—95	33	51	17
10.	MP	176	00	51	75	95	—51	—33	—17	—176		—95	33	—75	17	125	—125
11.	AP	—125	00	17	—95	33	125	75	176	51	—176		—17	—51	—33	95	—75
12.	BR	176	—33	—17	95	75	—51	176	125	—51	—125	75	—17		—176	00	—33
		RA	JC	MD	GF	WG	JH	—75	—95	125	51	—125		—176	00	17	33
14.	DT	176	—75	—125	51	95	—33	—51	75	—17	00	—95	17	33		125	—176
15.	WW	95	00	125	51	175	—17	—33	17	176	75	33	—125	—95	—75		—51
16.	GZ	176	33	—33	125	—17	—95	—51	00	95	17	—125	—75	—176	51	75	

*Decimal point dropped.

where the z scores are given in Table 5. Substitutions of these values, column-by-column, leads to the following factor scores for each child in the class:

TABLE 6
FACTOR SCORES

		F_{11}	F_{21}
1.	RA	1.39	.75
2.	JC	—.31	—.31
3.	MD	.53	—.49
4.	GF	.61	1.20
5.	WG	.49	.15
6.	JH	—.80	—.60
7.	RJ	—.91	—.59
8.	MK	—.62	.13
9.	AK	—.49	2.90
10.	MP	.59	—.09
11.	AP	—.82	—.78
12.	BR	12	—.44
13.	VS	—.63	2.34
14.	DT	.43	.18
15.	WW	.48	—.34
16.	GZ	—.25	.80

IV.

Interpretation of the factors obtained demands that the psychological or sociological meaning of the factors be determined. Factor one, a bipolar factor, is clearly that of sex. In spite of the age of these children, which averaged about 14 years, their choices cleaved strongly along the lines of sex, probably because of the situation in which the test was made. The children were being asked to choose partners in a project that would involve a good deal of work together, some perhaps out of school. It would have been socially impractical to have the groups mixed and perhaps the children realized this and reflected it in their choices.[11]

The nature of the second factor was recognized by the writer upon examining the scores for this factor as shown in Table 6. It was seen that these scores correlated markedly with the skill in science of the various

[11] "Sex" is used here only as the experimental designation of the factor and not as its description. From the subject's point of view we might suppose that this factor represents a highly correlated group of traits which divide sharply on sex lines—i.e., masculinity-femininity.

members of the class. For example, a rank-correlation between the second factor scores and the grades on the final test of the previous unit (chemistry) gave a correlation equivalent to a Pearson product-moment coefficient of .76 (P.E. = .11). This suggested immediately that those children for whom the second factor was important based part of their preference upon an estimation of the science-skill which the other members of the group might contribute as partners on the projects.

One might expect that the children who relied heavily upon a judgment of ability in science in their choices would be those who were less intimately related with the rest of the group and could not call upon more personal factors to determine their preferences. On the basis of the writer's direct experience with the group, this seemed to be the case. The three boys, WG, BR, and GZ, who had the only substantial loadings in factor two were rather localized in the group, had only a few associations, and during the time of observation did not change their social position. Of the girls, only AP showed appreciable weight in this factor, and again she was further on the fringe of the group than any other girl. The cause of the relatively high negative loading on factor two shown by the boy, DT, is not clear. If there was some reason for his not choosing his classmates with some regard for science-ability, but rather for the lack of it, it is not known to the writer. It is conceivable, of course, that a child might wish to avoid working with better students than himself, but whether this was the case for DT would be a matter for more specific investigation into the motives of his sociometric choice.

The results of the experiment can be summarized completely as shown in Table 7. Columns one, two, three, and four, indicate, respectively, the percentage of variance in each child's choice that is ascribable to the first and second common factors and to the specific factors and error; the second section of the table shows the factor scores. (The percentage of variance attributable to a factor was in each case obtained by squaring the corresponding factor loading.)[12]

Table 7 illustrates the two-fold nature of the preceding analysis.

The resolution and quantification of the components of the tele, on the one hand, give information about the child from his own point of view. They suggest the extent to which certain values have prompted his sociometric choice, provided these values are common to more than one person. About those more individual values which are lumped into the term "unique-

[12] Guilford, J. P., *op. cit.*, p. 488.

TABLE 7
SUMMARIZED RESULTS

	Percentage of variation in choice attributable to common factors and to uniqueness				Factor scores		
	Factor I* Sex		Factor II**		Sex		
Person	boys	girls	Reputation for science ability	Uniqueness***	boys	girls	Reputation for science ability
RA	39		00	61	1.39		.75
JC		67	00	33		—.31	—.31
MD	—		—	—	.53		—.49
GF	33		01	66	.61		1.20
WG	21		22	57	.49		.15
JH		35	01	64		—.80	—.60
RJ		61	01	38		—.91	—.59
MK		74	01	25		—.62	.13
AK	70		01	29	—.49		2.90
MP	89		01	10	.59		—.09
AP		54	05	41		—.82	—.78
BR	49		34	17	.12		—.44
VS		83	00	17		—.62	—2.34
DT	54		06	40	.43		.18
WW	29		01	70	.48		—.34
GZ	50		12	38	—.25		.80

*a_{j1}^2 **a_{j2}^2 ***$1-a_{j1}^2+a_{j2}^2$

ness," we can say less. If we can assume, however, that the portion of uniqueness attributable to error is sensibly equal for each member of the group, we then have a measure of what might be called the "individuality" of each child in choosing. Certainly it is of interest, even in this limited experiment, that the range of variation in choice which is *not* attributable to common factors should be so great. Ninety per cent of the variation in choice of the boy, MP, for example, is accounted for, while only thirty per cent of that of the boy, WW, is involved in common factors. The range among the girls is of similar magnitude. It seems reasonable to suppose that differences in the degree of individuality of choice are related to other, perhaps important, aspects of personality. Similarly, differences in the influence of the common factors, in this case, sex and science-ability, may assume significance when examined in the light of more detailed information about the children's personalities and social background.

The factor scores, on the other hand, summarize information about the

child from the point of view of the group. Much work that has been done on leadership of children among their peers depends upon personality ratings, similar to these scores, for example, the Tryon "Guess Who" test. An important difference between such a test and the sociometric test is that the criteria for rating separate qualities are not given to the children beforehand, but are inferred statistically from their response to a spontaneous sociometric situation. An example of an analysis of the factor scores has already been suggested by the observed high correlation between scores for reputation in science and actual grades in science. Similarly, on the basis of the writer's experience with the class, the factor scores seem to support conclusions drawn from direct observation. The score for the boys on the sex factor, for example, appear to stand in good relation with the hierarchy of prestige that existed in the subgroup of boys. The boy, RA, who is far ahead of the others on this factor was, in fact, a leader among the boys and, during the period of observation, was their representative for the boys club. The two boys, AK and GZ, who have negative, or "girl's" scores on the same factor were both poorly adjusted to their social surroundings, and each had developed his particular mode of reaction to the situation. As suggested by the science-ability scores, AK compensated for the insecurity of his position by intense work in science and, in fact, received a high score on the second factor. GZ, on the other hand, simply withdrew or resorted to troublesome behavior when he had the opportunity, and, as Table 7 shows, received only a middling score on the science factor.

In passing, it should be mentioned that the class in which the preceding experiment was performed was hardly typical of the secondary school class in science. The children were highly selected for scholastic ability and, because of the expense of their tuition, were restricted to higher economic and social classes. Larger, more heterogeneous classes in public schools would undoubtedly show a greater number of factors and less individual variation in choice.

V.

The foregoing method of analysis has been suggested to illustrate the possibility of applying factor analysis to sociometric data in order to resolve the tele into its more elementary psychological and sociological variables. It is hoped that techniques similar to this can clarify the discussion of sociometry in much the same way that conventional factor analysis has redirected the study of mental tests. If by their use some of the rich insights into human relations to be found in the sociometric literature can be put to statistical test and rendered more certain, these methods will have amply justified themselves.

PATTERNS OF SOCIOMETRIC CHOICE IN SMALL GROUPS: A MATHEMATICAL MODEL AND RELATED EXPERIMENTATION*

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1. *Introduction*

During the past few years, a number of mathematical and semi-mathematical models have been developed for various small group phenomena. Yet in spite of refined sociometic techniques, comparatively little attention has been directed to patterns of sociometric choice in small groups.

In *Who Shall Survive?*, Moreno (5 esp. pp. 75-76, pp. 103-106, 115-116) pioneered in establishing this field. Subsequently Moreno and Jennings (6) considered the probabilities of various sociometric patterns, and this approach was further developed by Bronfenbrenner (1), and by Edwards (3).

It is with these further problems that this paper deals. The question of what sociometric patterns are possible in a group of given size is discussed; and a mathematical model is presented, treating the likelihood of the several patterns, and the variation in pattern upon repeated sociometric choices.

In the development of this model, the techniques used by Rapaport (8, 9, 10), in his model for pecking order, were suggestive.

2. *Nature of a Model*

The word "model", as used in this paper, means a conception of a phenomenon, structure or process, in the real world. A model may be of any complexity, and may deal with a very specific phenomenon, or with a general class of phenomena. The Marxist conception of class struggle is a model for historical change, and Freudian libido theory of a model for psychological development. These two models certainly are not mathematical models, however. But many more recently developed models are mathematical in that they employ mathematical techniques to express relationships between symbolic variables. These symbolic variables are intended to correspond in some way to variables existing in the real world. Mathematical equations are formulated and solved by techniques which vary from grade school arithmetic to probability theory, vector analysis, and tensor calculus. Relativity theory, as formulated by Einstein, is a mathematical model for certain aspects of the real world, employing mathematics of an extremely esoteric sort.

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Models differ in the degree to which they mirror real phenomena. In general, a model contains certain assumptions about the phenomenon involved. From these assumptions are derived further statements about the phenomenon. Thus the choice of initial assumptions is crucial to the entire model. Models may be classified according to the nature of these assumptions; Bush (2) has divided them into "base-line models" and "real behavior models."

A base-line model is one whose assumptions are chosen not necessarily because they seem accurately to describe social science phenomena, but rather because they are convenient assumptions to work with. The goal of a base-line model is not to make accurate predictions concerning the behavior dealt with, but rather to show what would occur under the (hypothetical) initial conditions. *It is left until later to consider how closely the assumptions of the model approximate the real situation.* In a way the function of a base-line model is to isolate the effects of certain factors, by ignoring others, thus describing what the situation would be if the first group were the only factors operating. It is then possible to compare the real situation with this hypothetical situation, often gaining insight as to additional factors contributing to the result. In this sense, to isolate the effects of rationality, as defined by Von Neumann and Morgenstern (11), the theory of games ignores the effects of non-rationality by postulating that people behave rationally. This postulate is not an assertion that people really do behave rationally, but rather an assumption on which to build a model If it is found that in a particular real situation group behavior is different from that predicted by game theory, it follows that the people involved are not behaving rationally, and their non-rationality can then be examined as a deviation from the "base-line" of rationality.

Another example of a base-line approach is the familiar statistical concept of the null hypothesis. In this case, the assumption is made that chance is the only factor tending to produce deviation from the state postulated by the null hypothesis; and a decision is reached by statistical techniques as to how much deviation is reasonable under this assumption. If the observed state is beyond reasonable limits of the null hypothesis, it is concluded that factors other than chance are influencing the deviation.

If it is found that a real phenomenon differs from the corresponding phenomenon predicted by a base-line model, the assumptions of the model can often be revised to make them agree more closely with the actual conditions. The revised model, if all its assumptions are chosen to agree with the real situation, rather than simply because they are convenient to use, is a real behavior model.

The model presented here is intended, at least in its simplest form, as a base-line model, rather than as a real behavior model.

3. Basic Definitions and Assumptions

This model deals with a group of N persons: $a_1, \ldots, a_N$. Each person is asked to choose the person in the group (other than himself) that he likes best. Whether he is actually asked to choose the person he likes best, or the person with whom he would most like to eat dinner, or the person with whom he would most like to do any other stated activity, is irrelevant to the model. For the present, the problem of whether these questions all mean the same thing to the subjects is ignored, *but without the assumption that the model, once developed, will with equal closeness of fit describe the various potential sets of data to be expected from asking one or another of these questions.* Nor is it assumed that similarity in the agreement with these several sets of data would imply a similarity for the subjects in the meaning of the various questions.

The model assumes that encounters (interactions) take place between members of the group, but that these encounters are always between pairs of individuals. Thus each encounter involves only one pair of individuals. At the time of formation of the group, and again immediately after every encounter in which he participates, each person in the group states his choice of whom he likes best. If a particular person does not participate in a certain encounter, then his "choice" immediately after this encounter is defined as the same as his choice immediately after the most recent encounter in which he was a participant. Since the persons in the group are presumed not to know each other beforehand, it is assumed that the initial choices of each individual are made at random. That is, for each person in the group, all possible initial choices are equally likely.

All encounters are numbered in chronological order, as the 1st encounter, the 2nd encounter, etc., independent of the participants in any particular encounter. The choices of all persons after the n^{th} encounter $(n = 1, 2, \ldots)$ form a "pattern of choice". The chief concern of this paper is with the probabilities of the various possible patterns of choice, after the n^{th} encounter.

A brief consideration of the 3-person group $(N = 3)$ will make this clearer. After any encounter, each person chooses either of the other two persons. Since there are three persons, all of whom choose, there are $2 \times 2 \times 2 = 2^3 = 8$ possible combinations of choices. As an example, a_1 chooses a_2, a_2 chooses a_3, and a_3 chooses a_1. If choices are represented by arrows, this combination of choices can be represented as in Figure 1.

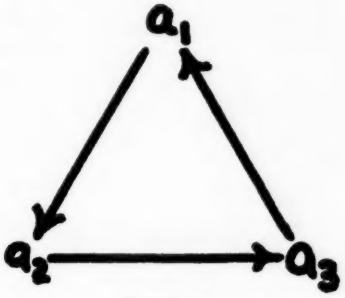

FIGURE 1

A simple cycle has been formed. If a_1 were to choose a_3, a_3 to choose a_2, and a_2 to choose a_1, a cycle would again be formed, as in Figure 2.

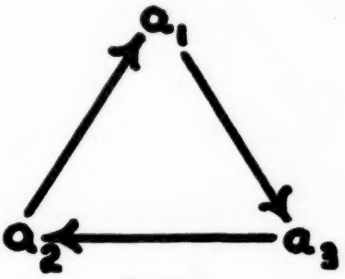

FIGURE 2

This cycle could be made identical to the previous one simply by re-labeling the persons in the group. The model is not interested in particular persons in the group, so these two combinations are considered as essentially the same. Therefore, a "pattern of choice" is defined as a combination of choices, together with all other combinations of choices reduceable to the first by a relabeling of persons in the group.

Thus a cycle (Figure 3) is a pattern of choice, which will be called S_1. If a_1 chooses a_2, a_2 chooses a_3, and a_3 chooses a_2, the resulting combination of choices is shown in Figure 4. This combination, together with all combinations reduceable to it by re-labeling, constitutes a pattern which will be called S_2 (Figure 5).

This pattern illustrates a concept for the model which is now to be defined for the general, N-person, group. If within the N-person group there exists a group of fewer than N persons such that each person in this subgroup chooses a person in the subgroup, by definition this subgroup is a "clique". Thus, in the combination of choices shown in Figure 4, a_2 and a_3 form a clique.

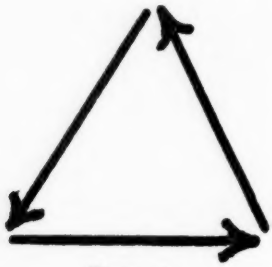

FIGURE 3

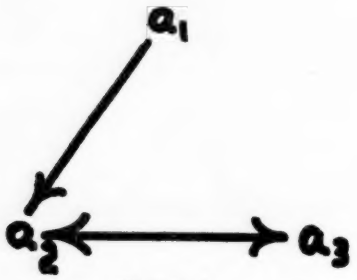

FIGURE 4

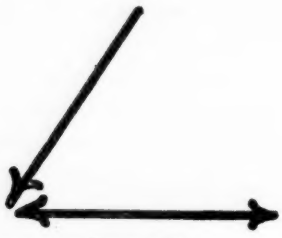

FIGURE 5

The probabilities of occurrence of the various patterns of choice, S_i, have not yet been explicitly considered. $S_i(n)$ is defined as the probability that S_i exists after the n^{th} encounter ($n = 1, 2. \ldots$), and $S_i(O)$ as the probability that S_i exists initially (before any encounters). Since one and only one of the S_i exists at any time,

$$\sum_{i=1}^{k_N} S_i(n) = 1 \qquad (n = 0, 1, \ldots) \tag{1}$$

That is, the sum of the probabilities of all patterns of choice after any given encounter is unity.

For $N = 3$; $i = 1$ or $i = 2$, since S_1 and S_2 are the only possible patterns of choice. In general, $i = 1, 2, \ldots, k_N$, where k_N is the number of possible patterns of choice for an N-person group.
$[S_i(n)]$ is the distribution of the probabilities $S_i(n)$; i.e., the probabilities of all possible patterns of choice S_i after the n^{th} encounter. $[S_i(n)]$ is the vector whose components are the $S_i(n)$ for $i = 1, 2, \ldots, k_N$. Thus $[S_i(n)] = (S_1, S_2, \ldots S_{k_N})$.

A list of the basic assumptions for the model follows. Some of them have already been mentioned.

(A) The initial choices of the N persons are random.

(B) Encounters occur between pairs of persons, and only between pairs. Each encounter involves only one pair of persons.

(C) All encounters are equally likely. (Any two persons are just as likely to meet in an encounter as any other two persons.)

(D) An encounter either has outcome 1 or outcome 2 for each participant in the encounter, and for each participant outcomes 1 and 2 are equally likely.

Note: A possible interpretation of these outcomes is that an encounter has outcome 1 for a participant if and only if he is favorably impressed by the encounter, outcome 2 if and only if he is unfavorably impressed by it. Under this interpretation, assumption (D) is equivalent to the statement that a person is either favorably impressed or unfavorably impressed by every encounter in which he participates, and he is just as likely to be favorably impressed by an encounter as to be unfavorably impressed.

(E) A person's choice immediately after an encounter in which he has participated depends only on that encounter, as follows:

(a) if the encounter has outcome 1 for the person, he chooses the other participant in the encounter.

(b) If the encounter has outcome 2 for the person, all possible choices by him are equally likely.[1]

[1] It was found that in the model for the 3-person group, the results were only slightly changed if assumption (Eb) were replaced by assumption (Eb'), as follows: If the encounter has outcome 2 for the person, he has zero probability of choosing the other participant in the encounter, and all other possible choices by him are equally likely. (In a 3-person group, he chooses the person who did not participate in the encounter.)

Note: An "encounter", in which two persons participate, has a distinct "outcome" for each participant in the encounter. The choice which a person makes immediately after an encounter in which he has participated depends upon the outcome which the encounter has for him. After any given encounter, the "choices" (see previous definition) of *all* individuals determine a "pattern of choice".

Prior to the analysis of particular groups, "transition probability" is defined for groups of any size. P_{ij} is the transition probability from S_i to S_j, the probability that if the existing pattern of choice is S_i, and an undetermined encounter takes place, the new pattern of choice will be S_j. Since S_j must be one, and only one, of the possible patterns of choice:

$$\sum_{j=1}^{k_N} p_{ij} = 1 \qquad (i = 1, 2, \ldots, k_N) \qquad (2)$$

That is, the sum of the transition probabilities from any given pattern of choice S_i to all other patterns of choice is unity.

P is the matrix of transition probabilities:

$$P = \begin{bmatrix} p_{11} & p_{12} & \cdots & p_{1k_N} \\ p_{21} & p_{22} & \cdots & p_{2k_N} \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ p_{k_N1} & p_{k_N2} & \cdots & p_{k_Nk_N} \end{bmatrix}$$

Note that the first subscript stands for row, and the second for column. It is clear from equation (2) that the rows sum to 1. Example, the 3-person group:

$$P = \begin{pmatrix} p_{11} & p_{12} \\ p_{21} & p_{22} \end{pmatrix}$$

$$p_{11} + p_{12} = 1$$
$$p_{21} + p_{22} = 1$$

That is, the sum of the transition probability from S_1 to S_1 and the transition probability from S_1 to S_2, is unity. Similarly, the sum of the transition probability from S_2 to S_1 and the transition probability from S_2 to S_2, is unity.

The matrix P of transition probabilities, together with $[S_i(O)]$, the distribution of the initial probabilities $S_i(O)$, completely defines a Markov chain with constant transition probabilities.

A rigorous definition is given by Feller (*4*, p. 309), but loosely speaking, a Markov chain is a sequence of events such that the outcome of each depends upon the outcome of the directly preceding event. Given any outcome for the n^{th} event, a set of probabilities is determined for the various potential outcomes of the $n + 1$ event. If this set of probabilities is completely determined by specifying the outcome which is directly precedent, without specifying the number of the event of which the outcome is the result, then the Markov chain has constant transition probabilities. That is, the probabilities of transition from each particular outcome of the n^{th} event to the various possible outcomes of the $n + 1$ event are independent of n.

In our model, if the pattern of choice S_i after the n^{th} encounter is specified, then the transition probabilities p_{ij} (with i held fixed according to the given S_i) are the probabilities of the various possible patterns of choice S_j after the $n + 1$ encounter. The p_{ij} are independent of n; i.e., transition probabilities are constant.

To obtain the probability distribution $[S_i(n + 1)$, from the probability distribution $[S_i(n)]$, all that is required is to apply the matrix operator P to $[S_i(n)]$. In other words, multiplication of the vector $[S_i(n)]$ by the matrix P yields the vector $[S_i(n + 1)]$. Any elementary text on matrix algebra gives the details of this process.

4. *Three-person Groups: Preliminary Analysis*

The first step is the enumeration of all possible combinations of choices and the observation of the pattern of choice to which each combination corresponds, as shown in Table 1.

By assumption (A), all the eight combinations shown in Table 1 are

TABLE 1

a_1 *chooses*	a_2 *chooses*	a_3 *chooses*	*Pattern of Choice*
a_2	a_1	a_1	S_2
a_3	a_1	a_1	S_2
a_2	a_3	a_1	S_1
a_3	a_3	a_1	S_2
a_2	a_1	a_2	S_2
a_3	a_1	a_2	S_1
a_2	a_3	a_2	S_2
a_3	a_3	a_2	S_2

equally likely. Hence, since there are 2 combinations which correspond to S_1 and 6 combinations which correspond to S_2:

$$S_1(O) = 1/4 = .25$$
$$S\ (O) = 3/4 = .75$$

For a 3-person group:

$$P = \begin{pmatrix} p_{11} & p_{12} \\ p_{21} & p_{22} \end{pmatrix}$$

Appyling P to $[S_1(O)]$, we see that

$$S_1(1) = p_{11}\ S_1(O) + p_{21}\ S_2(O).$$

By equation (2),

$$S_2(1) = 1 - S_1(1).$$

p_{11} and p_{21} must now be determined. By assumption (C), $p_{11} = p_{21}$; since, regardless which pattern exists, an encounter between any two persons leaves predetermined only the choice of the third person. This predetermined choice does not influence the post-encounter pattern of choice, because relabeling of group members is permitted. The permission to relabel means that the specification of only a single choice gives no information as to the pattern of choice. Hence:

$$S_1(1) = p_{11}\ [S_1(O) + S_2(O)] = p_{11}.$$

In general,

$$S_1(n) = p_{11}\ [S_1(n-1) + S_2(n-1)] = p_{11} \qquad (n = 1, 2, \ldots)$$

Consider the case in which the encounter has outcome 1 for both participants. By assumption (D), the probability of this is 1/4, and by assumption (Ea), the result must be S_2.

The case in which the encounter has outcome 1 for one participant, outcome 2 for the other participant, has probability 1/2 of occurring, and, by assumptions (Ea) and (Eb), S_1 has a conditional probability of 1/4, S_2 of 3/4.

There is probability 1/4 that the encounter has outcome 2 for both participants, and, by assumption (Eb), in this case S_1 again has a conditional probability of 1/4, S_2 of 3/4.

Hence;
$$p_{11} = p_{21} = 1/4(O) + 1/2(1/4) + 1/4(1/4) = 3/16$$
$$S_1(n) = 3/16 \cong .19 \qquad (n = 1, 2, \ldots)$$
$$S_2(n) = 13/16 \cong .81$$

5. Four-person Groups

Immediately after every encounter in which he participates, each person chooses any of the other three persons. As previously defined, the "choice" of any person after an encounter in which he is not a participant is the same as his choice after the most recent encounter in which he actually participated. Since there are 4 persons, for all of whom choices after every encounter are defined, there are $3^4 = 81$ possible combinations of choices. By enumeration of these as in the case of the 3-person group, it can be seen that these correspond to 6 patterns of choice, as shown in Figure 6.

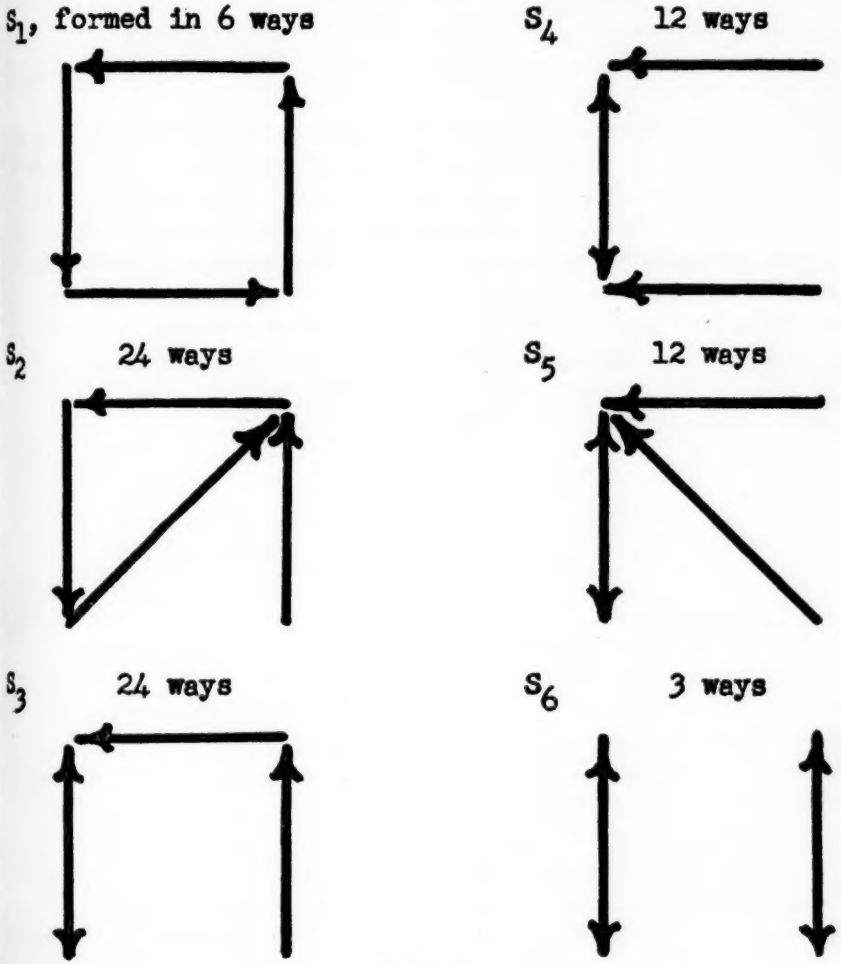

FIGURE 6

Hence; $S_1(O) = 2/27 \cong .07$ $\quad S_4(O) = 4/27 \cong .15$

$S_2(O) = 8/27 \cong .30$ $\quad S_5(O) = 4/27 \cong .15$

$S_3(O) = 8/27 \cong .30$ $\quad S_6(O) = 1/27 \cong .04$

Since there are 6 possible patterns of choice for a 4-person group,

$$P = \begin{bmatrix} p_{11} & p_{12} & \cdots & p_{16} \\ p_{21} & p_{22} & \cdots & p_{26} \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ \cdot & \cdot & & \cdot \\ p_{61} & p_{62} & \cdots & p_{66} \end{bmatrix}$$

As in the case of the 3-person group, the p_{ij} are determined by analyzing all possible results of all possible encounters. The problem is complicated, because now there are six situations that must be considered separately, depending on which pattern of choice exists when the encounter takes place. Yet the method is identical to that used in the 3-person case; only the results follow.

P is first stated accurately—but for ease in reference all transition probabilities are multiplied by 216, to avoid fractional notation—and then is given in the computationally more convenient decimal notation, with probabilities correct to two decimal places.

(216) P:

From \ *To*	S_1	S_2	S_3	S_4	S_5	S_6
S_1	24	60	102	24	6	0
S_2	17	56	80	34	28	1
S_3	10	44	72	44	28	18
S_4	9	44	64	30	52	17
S_5	8	44	56	16	76	16
S_6	4	32	72	68	4	36

$$P = \begin{bmatrix} .11 & .28 & .47 & .11 & .03 & .00 \\ .08 & .26 & .37 & .16 & .13 & .005 \\ .05 & .20 & .33 & .20 & .13 & .08 \\ .04 & .20 & .30 & .14 & .24 & .08 \\ .04 & .20 & .26 & .07 & .35 & .07 \\ .02 & .15 & .33 & .31 & .02 & .17 \end{bmatrix}$$

Finding $[S_i(n)]$ from P and $[S_i(0)]$ is extremely tedious, although straightforward; but the problem is essentially solved once $[S_i(1)]$, $[S_i(2)]$, and $[S_i(\infty)]$ have been determined (see Table 2). This can be accomplished relatively easily. To get $[S_i(1)]$, a single application of P to $[S_i(0)]$ suffices, and for $[S_i(2)]$, P is simply applied to $[S_i(1)]$.

To determine $[S_i(\infty)]$ it is important to note that since $P[S_i(n)] = [S_i(n+1)]$, $P[S_i(\infty)] = [S_i(\infty)]$. This reduces the problem to that of solving 6 simultaneous linear equations. It is possible to simplify to 5 equations; since, by equation (1),

$$\sum_{i=1}^{k_N} S_i(\infty) = 1$$

Rapoport (*9*, p. 279 f.) shows in detail how this is done.
Table 2 gives a fairly close approximation of $[S_i(n)]$ for any n.

TABLE 2

	$S_1(n)$	$S_2(n)$	$S_3(n)$	$S_4(n)$	$S_5(n)$	$S_6(n)$
$n = 0$	.07	.30	.30	.15	.15	.04
1	.06	.22	.34	.16	.17	.05
2	.05	.22	.33	.16	.17	.06
.	.	.	.	.	.	.
.	.	.	.	.	.	.
.	.	.	.	.	.	.
∞	.05	.21	.33	.17	.17	.06

6. *Recurrence Times*

From $[S_i(0)]$ and P, not only the probability distribution $[S_i(n)]$, $n = 1, 2, \ldots$; but also the mean and variance of the recurrence times for each pattern of choice can be found, using the method described by Feller (*4*, pp. 317, 320). That is, starting from any S_i after a particular encounter, it is possible to determine the mean and the variance of the number of additional encounters that take place before the pattern of choice is again S_i. Since transition probabilities P_{ij} are constant, it imposes no restriction to suppose that the particular encounter just referred to is the 0th encounter. $f_i(n)$ is defined as the probability that the first return to S_i occurs after the n^{th} encounter. $(n = 1, 2, \ldots)$.

$$f_i = \sum_{n=1}^{\infty} f_i^{(n)} \qquad (i = 1, 2, \ldots, k_n)$$

is the probability that the pattern of choice ever returns to S_i. If $f_i = 1$, a return to S_i is certain and the mean recurrence time, μ_i, is given by the following formula:

$$\mu_i = \sum_{n=1}^{\infty} n f_i^{(n)} \tag{3}$$

If $f_i < 1$, μ_i has no meaning. The variance, σ_i^2, of the recurrence times (assuming $f_i = 1$) can be found by the use of the following equation (*4*, p. 177 f.):

$$\sigma_i^2 = \sum_{n=1}^{\infty} n^2 f_i^{(n)} - (\mu_i)^2 \tag{4}$$

The computation of $[\mu_i]$ and $[\sigma_i^2]$ is left for Appendix I; only the results are given here.

$$\mu_1 = \frac{16}{3} \simeq 5.3 \qquad \mu_2 = \frac{16}{13} \simeq 1.2$$

$$\sigma_1^2 = \frac{208}{9} \simeq 23.1 \qquad \sigma_2^2 = \frac{48}{169} \simeq 0.28$$

This means that in a session of encounters and choices, the pattern S_1 is expected to recur every 5.3 encounters, on the average. Similarly, S_2 is expected to recur every 1.2 encounters, on the average.

The standard deviations, σ_i, are the positive square roots of the variances, σ_i^2. Thus;

$$\sigma_1 = \frac{4}{3}\sqrt{13} \simeq 4.8 \qquad \sigma_2 = \frac{4}{13}\sqrt{3} \simeq 0.53$$

The standard deviations (and variances) are measures of dispersion; the smaller is the standard deviation, the more concentrated is the distribution about its mean. Thus, the recurrence times of S_2 would be expected to be quite close to 1.2; S_2 probably will recur after either one or two encounters almost every time. In other words, there will be very few cases of consecutive occurrences of S_1. The number of repetitions of S_2 between successive occurrences of S_1 will vary considerably, however, to judge by the value of σ_1.

The determination of the mean and the variance of the recurrence times for the 4-person group is theoretically the same as for the 3-person case.

Computational difficulties, however, make the problem an extremely hard one to handle, and it is not attempted here.

The means and variances of the recurrence times are particularly meaningful for the 3-person group. In general, the mean recurrence time μ_i is the mean of the distribution of recurrence times of S_i for the entire sequence of encounters as n becomes infinite. In a real session of encounters, the expected mean recurrence time of S_i is not μ_i, although the longer the session is made, the more closely the mean recurrence time would be expected from the model, to approximate μ_i. The important point is that the deviation of the observed mean from μ_i, for a session of finite length, would not simply be due to normal sampling error, but would result from the fact that μ_i is the theoretical mean only for infinite sessions. For the 3-person group, however, the situation is less involved. $[S_i(n)]$ is independent of n, so, according to model, S_1 and S_2 are expected to occur with the same frequency in the first few encounters as in a longer sequence. Thus, although μ_i is the expected mean for an infinite sequence, in the 3-person case it also is the expected mean for any finite sequence of encounters. It is only because of this special property of the model for the 3-person group that μ_1 and μ_2 can be interpreted as above. Of course the situation for the variances is exactly the same.

7. *Three-person Groups: Further Considerations*

In this section a more general form of the 3-person model is presented. This form is obtained from the simple form presented above by revising the initial assumptions. These changes make the assumptions more complicated, but at the same time less arbitrary; thus, the general form of the model is less rigidly a base-line model than is the simple form.

Assumptions (C) and (D) are replaced by

(C') If the existing pattern of choice is S_1, all encounters are equally likely. If the existing pattern of choice is S_2, an encounter between clique-members has probability $1/3 + \delta$, while each of the other possible encounters has probability $1/3 - \delta/2$. $(0 \leqslant \delta < 2/)$.

(D') An encounter either has outcome 1 or outcome 2 for each participant in the encounter, as follows:

(a) If the encounter is between non-members of a clique, or between a member and a non-member, the encounter is just as likely to have outcome 1 for a participant as to have outcome 2.

(b) If the encounter is between fellow clique-members, the proba-

bility that the encounter has outcome 1 for a participant is $\frac{1}{2} + \epsilon$, the probability that the encounter has outcome 2 for a participant is $\frac{1}{2} - \epsilon$. $(0 \leqslant \epsilon < \frac{1}{2})$.

Individual consideration of all possible results of all possible encounters, as done previously, is now quite messy, and only the results are given.

$$P = \begin{pmatrix} 3/16 & 13/16 \\ 3/16 - \Delta & 13/16 + \Delta \end{pmatrix} \tag{5}$$

where $\Delta = \epsilon/6 + \epsilon^2/12 + \delta\epsilon/2 + \delta\epsilon^2/4$

$$\begin{aligned} S_2(n) &= p_{12}\, S_1(n-1) + p_{22}\, S_2(n-1) \\ &= 13/16\ [1 - S_2(n-1)] + [13/16 + \Delta]\ S_2(n-1) \end{aligned}$$

$$S_2(n) = 13/16 + \Delta S_2\ (n-1)\,. \tag{6}$$

On solving this difference equation,[2] it is found that

$$S_2(\infty) = 13/16 \cdot 1/1-\Delta$$

$$\begin{aligned} S_2(n) &= S_2(\infty) - [S_2(\infty) - S_2(O)]\ \Delta^n \\ &= 13/16 \cdot 1/1-\Delta - [13/16 \cdot 1/1-\Delta - 3/4]\ \Delta^n \end{aligned}$$

$$S_2(n) = \frac{13 - \Delta^n - 12\,\Delta^{n+1}}{16\,(1-\Delta)}$$

$$S_1(\infty) = 1 - S_2(\infty) = \frac{3 - 16\Delta}{16\,(1-\Delta)}$$

$$S_1(n) = 1 - S_2(n)$$

Further discussion of Δ may be interesting. If the biases δ and ϵ are allowed to vary over the entire ranges $0 \leqslant \delta < 2/3$ and $0 \leqslant \epsilon < \frac{1}{2}$; then Δ varies over the range $0 \leqslant \Delta < 5/16$. But by equation (5), $0 \leqslant \Delta \leqslant 3/16$. This imposes a further restriction on δ, ϵ.

Another point is that $S_2(\infty)$ is a decreasing function of Δ. If $\Delta = 0$(no bias), $S_2(\infty) = 13/16$. If $\Delta = 3/16$ (maximum bias), $S_2(\infty) = 1$. In general, the greater the bias, the more likely it is that the limiting pattern of choice will be S_2.

Still greater generalization of the 3-person model can be achieved by permitting the biases δ and ϵ to range over negative, as well as positive values.

In the model for the 4-person group, the p_{ij} easily can be modified to

[2] See Appendix II.

allow for these two biases, as in the 3-person model, but the subsequent computation of $[S_1(\infty)]$ is prohibitively messy.

8. Three-person Groups: Experimentation

In developing experimental procedure, it is necessary to distinguish between two classes of the basic assumptions listed in Section 3. The experimental situation presented here has assumptions (A), (B), and (C) built into it. The validity of assumptions (D) and (E) *for this situation* is estimated from the experimental data.

Four sessions of encounters and choices were run, each involving three persons. Harvard undergraduates, naive as to the nature of the investigation, were employed. No subject was used in more than one session. Sessions consisted of thirty encounters. Subjects were not asked to choose a preferred other person, however, until after both of the others had been met. Thus, no choices were made until after the third encounter, and for our purposes the sessions consisted of 28 encounters followed by choices; hence, 28 patterns of choice.[3]

As each participant arrived at the scene of the experiment, he was placed in a room by himself. He was assigned a letter—A, B, or C—and the door of his room was labeled correspondingly.

Encounters consisted of one-minute visits by one subject in the room of another subject. Visits began at the signal of a knock on the door by the experimenter and ended at another such knock. One minute was allowed between visits. It had been decided to prepare in advance a schedule of the visits that would be made by each participant, and each was given a sheet on which were listed the visits that he was to make. The sequence of visits was as follows ("AB" is used here to mean "A visits B"): AB, BC, CA, BA, CB, AC. This sequence of six visits occurred five times—30 visits in all. Each subject made five visits to each of the rooms of the other participants, therefore, and was visited by each of the other participants five times.[4]

[3] In a pretest, subjects were asked to state an initial preference before having met either of the other participants, and also to state a preference after only one of the others had been met. It was felt, however, that this made the subjects conscious of a kind of randomization, and may therefore have influenced the result. There was some indication that the subjects tried to remain affectively neutral toward the other participants, or at least did not want to become more involved with one than with the other.

[4] In the pre-test, subjects were allowed to choose for themselves to whom they made visits. There was a noticeable tendency toward both an "impartial" alternation of visits and an "impartial" alternation of choices. It was felt that specifying visits might help in separating these two parts of the subjects' behavior, leaving the choices com-

On the sheet given each subject, space was provided for him to record at the end of each visit the letter of the person he liked best at that time. Subjects were particularly instructed not to use "an arbitrary or a chance system for choosing, like flipping a coin". They were told that careful, feelingful choices were desired, and were assured that anonymity would be preserved.

In order to satisfy assumption (A), an attempt was made to obtain subjects in groups of three, none of whom knew either of the others. Actually, as mentioned above, the subjects did not make initial choices. The assumption is made, however, that *initial choices would have been random*, had not methodological considerations precluded their being asked for.[5]

Assumption (B) was satisfied by the procedure that has been outlined. All doors were kept closed at all times except when someone was actually passing through them.

Assumption (C) was essentially satisfied, since the visits to be made were determined in advance, and in no way depended upon any preferences stated by the subjects. Thus the encounters were completely independent of the patterns of choice. This is what is meant by assumption (C). The fact that encounters were not independent of the letters that had been assigned to the subjects is entirely irrelevant, since these letters had been assigned arbitrarily, and were completely independent of the pattern of choice existing at any time.[6]

The simple form of the model leads to very simple predictions for this situation. For the 3-person group, $[S_1(n)]$ is independent of n $(n = 1, 2, \ldots)$. Since after each encounter the probability is 13/16 that the pattern of choice is S_2, independent of the pattern of choice after the previous encounter, the

paratively free of this bias toward impartiality. This feeling was decidedly confirmed by new data.

[5] In two of the four sessions, two of the subjects knew each other beforehand. In each of these two cases, however, there was practically no tendency for a clique to form between the two persons who already knew each other. In one case, this clique occurred once out of 28 times; in the other, twice out of 28 times. In the light of these results, the lack of complete success in the attempt to obtain subjects who were total strangers to one another is thought to be unimportant.

[6] In the pre-test assumption (C) was not built into the experimental situation. Rather it was left in the class with the assumptions (D) and (E), as something to be examined in the light of the data. With subjects allowed to choose their own visits, assumption (C) definitely had to be rejected. The tendency toward impartiality in visits and choices gave the patterns of choice considerable influence over the visits that were made.

pattern of choice is expected to be S_2 after 13/16 of the encounters, and to be S_1 after 3/16 of the encounters.

Since there were four sessions, and 28 patterns of choice in each, there were 112 patterns of choice in all. Thus the expected value of the number of occurrences of S_2 is 112 (13/16), or 91. S_2 actually occurred 91 times. It therefore seems likely that the model is reasonably accurate for this situation. Of course it is not maintained that should further sessions be seen, the expected value would be achieved *exactly*, as it was in this case.

The model predicts not only $[S_1(n)]$, but also the transition probabilities p_{ij}. Expected values are $p_{12} = p_{22} = 13/16 \cong .81$. On 19 occasions, not counting the last pattern of choice formed in each session, the pattern of choice was S_1. Thus the expected number of times for S_1 to change to S_2 on the next encounter is 19(13/16), approximately 15.5. S_1 actually changed to S_2 on the next encounter six times. On eighty-nine occasions, again not counting the last pattern of choice formed in each session, the pattern of choice was S_2. The expected number of times that S_2 remains S_2 upon the next encounter is therefore 89(13/16), approximately 72.3. S_2 actually remained S_2 eighty-one times. From the experimental data, it is seen that if p_{ij}^* is the observed transition probability corresponding to the theoretical transition probability p_{ij},

$$p_{12}^* = 6/19 \cong .32$$

$$p_{22}^* = 81/89 \cong .91$$

Computing χ^2 (1 degree of freedom) for these results, it is found that

$$\chi^2_{12} = (15.5-6)^2/15.5 + (13-3.5)^2/3.5 \cong 31.6$$

$$\chi^2_{22} = (81-72.3)^2/72.3 + (16.7-8)^2/16.7 \cong 4.5$$

These values for χ^2 are both significant at the .05 level. Thus in a binomial distribution with the probability of a change from S_1 to S_2 equal to 13/16, and in a binomial distribution with the probability of S_2 remaining S_2 equal to 13/16, the reported p_{ij}^* could not have occurred by chance by reasonable standards of inference. Thus the hypotheses that $p_{12} = 13/16$, $p_{22} = 13/16$ are rejected.

It must be concluded that assumptions (D) and (E) do not accurately describe the experimental situation presented here. The choice made by a person after a given encounter must depend in some way upon previous encounters. The nature of this dependence cannot now be stated. However,

the accuracy with which the number of occurrences of S_2 was predicted indicates that this dependence is not such as to destroy the usefulness of the model. Actually, in the development of the model the p_{ij} were interesting only as a means of determining $[S_i(n)]$. The accuracy of $[S_i(n)]$ and the inaccuracy of the p_{ij} shows that while assumptions (D) and (E) do not actually describe the way choices are made, the use of these assumptions does appear to approximate quite closely the results of the choice process. This gives considerable support to the model here presented.

Because assumption (C) was built into the experimental situation that was used, the general form of the 3-person model could not be applied to this situation. No experimentation has yet been done with this form of the model, or with the model for 4-person groups.

9. Discussion

A model for patterns of sociometric choice in small groups has been presented. It has been presented only as a base-line model. It is not intended to describe accurately the process of sociometric choice in small groups. Rather it makes certain hypothetical assumptions about this process, and derives certain further statements about the process from these initial assumptions. ***The assumptions are not presented as statements of fact, but only as a convenient base from which to work.*** The experimentation reported in this paper suggests, however, that *for a certain special situation,* the simple form of the model for three-person groups predicts fairly accurately the fraction of the total number of patterns of choice that involve a "clique"—in spite of the derivation of this prediction from assumptions which do not accurately describe the real situation.

The construction of mathematical models that reproduce real situations accurately is a project of considerable difficulty. In the model presented here, there is no attempt at faithful reproduction. Yet there are problems even in this case. There is no theoretical reason why this model should not apply to the general N-person group, but in practice the model becomes extremely complex as N increases. The three-person case is mathematically trivial. In the simple form of the model, without consideration of biases, the 2×2 matrix of transition probabilities has identical rows, so is completely defined (since rows sum to unity) by the specification of a single transition probability. Consequences of this are the constancy of the probability distribution $[S_i(n)]$ for all n, and the ease with which this distribution can be determined.

The 4-person case is much more complicated. There are six structures to deal with instead of two, and the resulting 6×6 matrix has all its rows

dissimilar. $[S_i(n)]$ varies with n, and considerable labor is required to determine $[S_i(n)]$ accurately for any n. Even the approximation of $[S_i(n)]$ by computing $[S_i(1)]$, $[S_i(2)]$, and $[S_i(\infty)]$ is a tedious process. Consideration of biases is virtually prohibited by extreme computational difficulty. Although in the 3-person case some discoveries can be made about the distribution of recurrence times, for the 4-person group it seems prudent to forego similar investigation.

Beyond the 4-person group, it is exceedingly difficult even to approximate $[S_i(n)]$ for the simple form of the model, and this is not attempted in this paper. For the 5-person group, for example, there are thirteen possible patterns of choice. This means that a 13 x 13 matrix is involved. Besides, the mere computation of the initial probability distribution $[S_i(0)]$ is something of a project, because there are now $4^5 = 1024$ possible combinations of choices to examine.

Since application of the model for a specific N ($N > 4$) appears difficult, some valid, though limited, generalizations for all N might be hoped for. Unfortunately none are apparent. There is no obvious way of determining even the number of patterns of choice possible for a group of N people, other than by examining all possible combinations of choices, as was done in the 3- and 4-person cases. In the N-person group, each person has N-1 possible choices open to him. Since all N persons choose, there are $(N-1)^N$ possible combinations of choices, a number which very soon gets completely out of hand. As suggested above, the determination of the matrix of transition probabilities for a group of five or more people is extremely tedious, and no shortcut is available. Once this matrix is obtained, the problem of applying it to determine $[S_i(n)]$, or even $[S_i(\infty)]$, is still more prohibitive.

For the reasons which have just been outlined, expansion of even this base-line model beyond three- and four-person groups does not seem feasible. A model attempting to describe actual situations more closely might well require more assumptions, or assumptions that are more difficult to work with. It should be remembered that in the model presented here, assumptions are chosen so as to be easy to work with. If it is required that the assumptions be an accurate description of a real situation, they might well fail to satisfy the earlier criterion. As Moreno and Jennings suggest (*6*, p. 6), the application of valid mathematical techniques becomes increasingly difficult as the model approximates the complex real situation more and more closely.

A mathematical model constructed so as to describe accurately a real situation can have considerable value in prediction. Even a base-line model can be useful in several ways. Sometimes the pseudo-process portrayed by the

assumptions of the model leads to results quite similar to the results of the actual process. This was found to be the case in a special application of the 3-person model presented in this paper. In such a case the base-line model can be used cautiously for prediction. Without predictive power, a base-line model still can be useful. Comparison of the false predictions which it makes, with the actual situation, may give insight as to factors that the model has not taken into account. Also, the mere translation of a problem into mathematical notation, and the logico-mathematical derivation of consequences from initial assumptions is often enough to suggest factors that would otherwise be ignored.

To be valuable in the ways outlined, it is important that mathematical models not be constructed apart from all empirical considerations. To be meaningful, a model should be related to a real situation. Preferably, it should be possible to determine empirically just how it is related. Predictive power can not be confirmed without empirical verification. In the case of base-line models, insight can often be gained by an analysis of the failure of the model to describe the real situation; but this is impossible without a comparison of the model's predictions with empirical data.

The development of mathematical models is a useful, constructive part of contemporary social science. Advance in this field necessarily will be slow, but progress will be hastened by close contact between model-building and experimental research.

Appendix I

The computation of $[\mu_1]$ *and* $[\sigma_1^2]$ *for the simple form of the 3-person model:*

Before $[\mu_1]$ or $[\sigma_1^2]$ can be computed, p_{ij}^{n} must be defined. p_{ij}^{n} is the probability that the pattern of choice after the $r+n$ encounter is S_j, given that the pattern is S_i after the r^{th} encounter.

In particular:

$$p_{ij}^{(1)} = p_{ij},$$

$$p_{ij}^{(2)} = \sum_m p_{im}p_{mj};$$

and:
$$p_{ij}^{(n+1)} = \sum_m p_{im}p_{mj}^{(n)} \qquad (n=1, 2, \ldots).$$

Now:
$$f_1^{(1)} = p_{11},\ f_1^{(2)} = p_{11}^{(2)} - f_1^{(1)}p_{11}, \tag{7}$$

and:
$$f_1^{(n)} = p_{11}^{(n)} - f_1^{(1)}p_{11}^{(n-1)} - \ldots - f_1^{(n-1)}p_{11} \qquad (n=1, 2, \ldots). \tag{8}$$

For the three-person group, there is no difficulty in finding $[\mu_1]$ and $[\sigma_1^2]$. Since the $S_1(n)$ are independent of n, the $p_{11}^{(n)}$ are constant for all n. In particular, $p_{11}^{(n)} = 3/16$.

Hence, by equation (7): $f_1^{(1)} = 3/16$.

By equation (8): $f_1^{(n)} = p_{11}^{(n)} [1 - f_1^{(1)} - f_1^{(2)} - \ldots - f_1^{(n-1)}]$
$= 3/16 [1 - f_1^{(1)} - f_1^{(2)} - \ldots - f^{(n-1)}]$

Similarly: $f_1^{(n-1)} = 3/16 [1 - f_1^{(1)} - f_1^{(2)} - \ldots - f_1^{(n-2)}]$

Hence: $f_1^{(n)} = f_1^{(n-1)} - 3/16 f_1^{(n-1)} = 13/16 f^{(n-1)}$

$f_1^{(n)} = 3/16 (13/16)^{n-1}$

$$f_1 = \sum_{n=1}^{\infty} f_1^{(n)} = 3/16 \sum_{1}^{\infty} (13/16)^{n-1}$$

By Peirce (*7*, 755.); $\sum_{1}^{\infty} (13/16)^{n-1} = 16/3$.

Hence; $f_1 = 1$.

By equation (3); $\mu_1 = \sum_{n=1}^{\infty} n f_1^{(n)} = 3/16 \sum_{1}^{\infty} n(13/16)^{n-1}$.

By Peirce (*7*, 758.): $\sum_{1}^{\infty} n(13/16)^{n-1} = (16/3)^2$.

Hence: $\mu_1 = 16/3 = 5.3$.

In the same way:

$p_{22}^{(n)} = 13/16$

$f_2^{(1)} = 13/16$

$f_2^{(n)} = 13/16 (3/16)^{n-1}$

$f_2 = 13/16 \sum_{1}^{\infty} (3/16)^{n-1} = 1$

$\mu_2 = 13/16 \sum_{1}^{\infty} n(3/16)^{n-1} = 16/13 \cong 1.2$

By equation (4): $\sigma_1^2 = \sum_{n=1}^{\infty} n^2 f_1^{(n)} - (\mu_1)^2$

$= 3/16 \sum_{1}^{\infty} n^2 (13/16)^{n-1} - (16/3)^2$.

By Peirce (7, 748.): $\frac{1}{2} \sum_{0}^{\infty} (n+1)(n+2)(13/16)^n = (16/3)^3$

But

$$\sum_{0}^{\infty} (n+1)(n+2)(13/16)^n$$

$$= \sum_{1}^{\infty} n(n+1)(13/16)^{n-1}$$

$$= \sum_{1}^{\infty} n^2(13/16)^{n-1} + \sum_{1}^{\infty} n(13/16)^{n-1}$$

Hence: $\sum_{1}^{\infty} n^2(13/16)^{n-1} = 2(16/3)^3 - (16/3)^2$

And: $\sigma_1^2 = (16/3)^2 - 16/3 = 208/9 \cong 23.1$

Similarly: $\sigma_2^2 = \sum_{1}^{\infty} n^2 f_2^{(n)} - (\mu_2)^2$

$$= 13/16 \sum_{1}^{\infty} n^2(3/16)^{n-1} - (16/13)^2$$

$$\sigma_2^2 = (16/13)^2 - 16/13 = 48/169 \cong 0.28$$

Appendix II

The solution of the simple difference equation in the general form of the three-person model:

Equation (6) is a special case of the general difference equation:

$$\chi(n) = a + b\chi(n-1)$$

The solution of equation (6), then, follows immediately from the following results for the general case:

$$\chi(\infty) = \frac{a}{1-b} \tag{9}$$

$$\chi(n) = \chi(\infty) - [\chi(\infty) - \chi(0)]b^n \quad (n = 1, 2, \ldots) \tag{10}$$

Equation (9) will be derived, and equation (10) will be proved by induction.

$$\chi(n) = a + b\chi(n-1)$$

Therefore: $\chi(\infty) = a + b\chi(\infty)$

Hence: $\chi(\infty) = \frac{a}{1-b}$

To prove equation (10) for all n, it will first be shown that equation

(10) is true for $n = 1$; and then that if, given k, it is true for $n = k$, it is true for $n = k + 1$.

$$\chi(1) = a + b\chi(o)$$

$$= a\,\frac{1-b}{1-b} + b\chi(o)$$

$$= \frac{a}{1-b} - \left[\frac{a}{1-b} - \chi(o)\right]b$$

$$= \chi(\infty) - [\chi(\infty) - \chi(o)]b^1$$

Now suppose that: $\chi(k) = \chi(\infty) - [\chi(\infty) - \chi(o)]b^k$

Then:
$$\chi(k+1) = a + b\chi(k)$$

$$= a + b(\chi(\infty) - [\chi(\infty) - \chi(o)]b^k)$$

$$= a\,\frac{1-b}{1-b} + b(\chi(\infty) - [\chi(\infty) - \chi(o)]b^k)$$

$$= \chi(\infty) - b\chi(\infty) + b\chi(\infty)$$
$$- [\chi(\infty) - \chi(o)]b^{k+1}$$

$$= \chi(\infty) - [\chi(\infty) - \chi(o)]b^{k+1}$$

qed.

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A "CHESS-BOARD SOCIOGRAM" FOR SOCIOGRAPHIC REPRESENTATION OF CHOICE DIRECTIONS AND FOR THE ANALYSIS OF "SOCIOMETRIC LOCOMOTIONS"

Some Methodological Contributions to the Graphic Representation of Sociometric Data

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Introduction. Classification based on sociometric variables. Sociometric typology.

Several attempts to advance social "types" have been made in sociology and social psychology.[1] *One* inherent danger in such descriptions of individuals based on a type system is that the research worker is contented with everyday collecting words, none of them very precise. *Another* risk in classification is that he may adopt a too specialized and hence somewhat unproductive point of view. From a technical standpoint we might in the first case speak of a group of variables, not operationally defined; in the other case about a limitation to one variable of relatively restricted character.

It is obvious that the sociometric variables—those points of view from which the individuals vary in sociometric tests—are theoretically infinitely numerous, should we take into consideration all possible choice aspects, all possible choice roles (choice criteria). In order to limit the number of variables to a practical minority and at the same time to avoid non-essentia in typology and classification, we require in the first place to consider only viewpoints common to all choice aspects (choice criteria), viz., "interaspectal" variables. The number of received choices—the degree of "accept-

[1] It is to be observed that the word "type" here and in the following is used in the same sense as "category", i.e., as a collective noun for a number of persons, who are like (or relatively like) in certain respect at a certain time. The question as to whether an individual is constantly of the same type and the question as to the degree the characteristics of the type correlate with physical variables or "depend on" other more "fundamental" variables—circumstances which are sometimes implied in the concept of type—are here intentionally left out of consideration. Contrary to the relatively inflexible somatopsychical type (e.g., that of Kretschmer) the sociometric type should often be interpreted as a relatively flexible "role type" (dependent on how the role of the individual is shaped in the existing group). Those different nuances of meaning do not affect the definition, which is here made sufficiently wide to include both.

ance" or "desirance"—is the variable, which has most frequently been used in sociometric classifications. An example is the usual differentiation between the sociometrically "overchosen", "middle-chosen" and "underchosen", whereby the manner of establishing the limits have been different:[2] you may, like Bronfenbrenner, try to determine the statistically significant deviations and place the deviant cases in the external categories;[3] you may fix the limit between the middle class and extreme classes at ± 1 S.D. like Jennings;[4] or you may simply allot a certain percentage to the different categories like Northway.[5]

However, it seems more profitable to take interest in more than one sociometric variable. It seems suitable to choose with Jennings[6] the following six: given choices, received choices, reciprocated choices; given rejections, received rejections, reciprocated rejections.* The position of the individual in the single variable is denoted by Jennings with + and — for values above and below the mean of the group. She thus obtains a relatively surveyable formalization of what she calls the choice-and-rejection pattern of the individual, though placing the plus and minus signs for the six variables in a certain order (corresponding to the order in our enumeration above). The choice-and-rejection pattern + — — — — — — means thus, that a certain individual has a value above the mean as to the number of given choices, but that he has values below the mean as to the other five variables.

The symbolization of the sociometric types.

Considering that the number of received choices and the number of received rejections often are more important to know than the number of

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[2] Of course the limits are always relatively arbitrary, and perhaps the question arises, why we on the whole attempt a classification, when we have a quantitatively differentiated scale. The answer must be, that a scale can be *too* differentiated to be altogether psychologically significant. An individual who receives 8 choices is insufficiently distinguished from a person who receives 7 or 9 (in the same way as e.g., an IQ of 114 is not clearly separated from an IQ of 112 or 116.)

[3] Bronfenbrenner, Urie: The measurement of sociometric status, structure and development. SOCIOMETRY Monographs No. 6, 1945, p. 41-42.

[4] Jennings, Helen H.: Leadership and Isolation. 2nd ed., (N. Y. 1950), p. 67, 114.

[5] Cf., Bronfenbrenner: Op. cit., p. 37-39.

[6] Jennings, Helen H.: Leadership and Isolation, p. 92-94.

* According to Moreno there are three additional variables: *given indifferences, received indifferences, reciprocated indifferences* which brings the number of variables to *nine*; see J. L. Moreno's *Who Shall Surivive?* Revised Edition, New York, 1952. This would require an extension of the system of symbolization presented in this paper. (*Ed*).

given choices and the number of given rejections (in fact these later "outgoing" sociometric variables are frequently less constant), it would perhaps have been better to have used the following order in the choice-and-rejection pattern: received choices, given choices, reciprocated choices; received rejections, given rejections, reciprocated rejections. In order not to evoke unnecessary confusion Jennings' order is preserved in the present paper.

If "choice-and-rejection patterns" of this kind are to form the foundation for typology and classification, it will probably be of advantage, if another type of symbols can be used. These symbols should be independent of a special arbitrary order between the variables; they should also be somewhat shorter and more manageable. To speak about the sociometric "+ − + − − +" type, the "− + − + − +" type and 62 other types in that way (we have 64 possible constellations) is rather inconvenient, and mistakes as to the variables are easily made. Here we therefore propose an alternative system of symbolization, which is founded on two principles: 1) to symbolize each of the six sociometric variables in question with a special sign (a letter) and 2) to indicate plus variation (above the mean) by using this symbol, minus variation (below the mean) by not using it. The following system of symbols might be used:

p = given choices	n = given rejections
$\bar{p}$ = received choices	$\bar{n}$ = received rejections
r = reciprocated choices	$\bar{r}$ = reciprocated rejections

$P = p \,\&\, \bar{p}$
$N = n \,\&\, \bar{n}$
$R = r \,\&\, \bar{r}$

By using in this way the same letter for related variables (p and $\bar{p}$ for positive attitudes, n and $\bar{n}$ for negative attitudes, r and $\bar{r}$ for reciprocations) and capital letters for summing up such related variables (P for "p and $\bar{p}$" etc.), the symbols can be comprehended at a glance. Instead of now speaking of a "+ − − − − − −" type we speak of a p-type, instead of a "+ + − − − − −" type we say P-type, instead of a "+ + + + + +" type we say a PNR-type—to take only a few examples.[7]

It may often be desirable to be able to give a short-hand key-word

[7] The shortness of the symbols is a help in the first place in writing and for memorizing. The reading may be done thus, that, for instance, the letters with a line are given the name of the corresponding Greek letters: $\bar{p}$ = phi, $\bar{n}$ = nu, $\bar{r}$ = rho. Capital letters may be read as double-p, double-n, double-r (or as p-phi, n-nu, r-rho).

description of a sociometric type. A series of standardized terms is then frequently of value, too. We might, for example, use the following:

high p = positively expansive
" $\bar{p}$ = desired
" r = positively reciprocating
" n = negatively expansive
" $\bar{n}$ = rejected
" $\bar{r}$ = negatively reciprocating

high p & high $\bar{p}$ (P) = (generally) positive
" n & " $\bar{n}$ (N) = (generally) negative
" r & " r (R) = ambivalently reciprocating
" p & " n (pn) = ambivalently expansive
" $\bar{p}$ & " $\bar{n}$ ($\overline{pn}$) = disputed

It is to be observed, that these terms are all operationally defined by the sociometric test. That a person is "desired" means nothing more than that he has received more choices than the group mean. It might perhaps have been desirable for some of the terms to have been somewhat less "loaded" with associations from everyday language (this is chiefly true of "desired" and "disputed"), but when you want to avoid such terms you always have the possibility of using the neutral type symbols ($\bar{p}$-type, $\overline{pn}$-type etc.) In the key-word description it is often profitable to define using the words "one-factor type", "two-factor type" etc., after the characterizing term denoting that the values of the other variables have not reached M. When thus, for example, the $\bar{n}$-type is said to be a "rejected one-factor type", this does not only mean that the individual with this type-symbol is often rejected in comparison with his group, but also that he is not very expansive either positively or negatively, not very desired and not very reciprocating either positively or negatively (all this, of course, in comparison with his group and its other members).

The "Chess-Board Diagram". Its Construction

Introduction.

Space thinking, the thinking with reference to spatial root metaphors, is fundamental both in everyday language and in scientific work. The field dynamic psychology and the sociographic methods are both good examples. The sociogram is an attempt to visualize the social and psychological distance with the help of the physical distance—we get what Meuter has called

"distance optics".[8] A sociogram is according to Moreno[9] a map which shows the psychological relations in a group: on this map the individuals are symbolized by circles, squares or triangles and the relations between them with lines of different colours or form. All this is very well known. Certain modifications and improvements have been made from time to time. It was early pointed out that the sociogram was frequently confusing to the eye.

Moreover, its structure depended to a certain degree on the person who made it. Sociograms, made up by different investigators from the same primary material, might take on quite different appearances, because the placing of the individual symbols was quite arbitrary.[9a] A modification developed by Northway, called the "target diagram",[10] was regarded as a fundamental improvement. This type of sociogram uses a stratification of the individuals into a number of levels, almost always three or four, according to the number of received choices, whereby each level is represented in the diagram by an area of the target diagram, the highest level being in the center, the lowest in the periphery. The target diagram has been widely used and has been adapted to different ends.[11] Two deficiences are still

[8] Meuter, Hanna: Das Testverfahren in der Soziographie (in Abhängigkeit und Selbständigkeit im sozialen Leben, herausgeg. v. L. v. Wiese, Köln u. Opladen, 1951, p. 23-28 (p. 24). In the main we do not find a direct application of the principle of distance in the usual sociograms, only certain approximations (as e.g., when the most chosen is placed at the top or at the center and far from the not chosen). More direct applications are, of course, also possible. One might, e.g., symbolize first choices with a very short line, second choices with a longer line etc. Such a more direct application is discussed by Proctor and Loomis (p. 563-565), who speak about five different distances: mutual choice being the shortest, mutual rejection the longest, while choice-rejection and mutual indifference are symbolized by middle distances. When we want to symbolize several individuals at a time it will however (as Proctor and Loomis remark) be impossible strictly to follow such rules.

The principle of distance is applied in Moreno's *position and movement diagram*, also called *locogram*. See Das Stegreiftheater, 1923, p. 88, "Das Stellungsdiagram"; see also *Who Shall Survive?*, revised edition (*Ed.*).

[9] Moreno, J. L.: Who Shall Survive?, p. 432.

[9a] Edgar Borgatta has shown in "A Diagnostic Note on the Construction of Sociograms and Action Diagrams", Group Psychotherapy, Vol. III, No. 4, March, 1951, pp. 300-308, how the sociogram can be so arranged that it is easy on the eye and presents a minimum of arbitrariness (*Ed.*).

[10] Northway, Mary L.: A method for depicting social relationships obtained by sociometric testing. SOCIOMETRY III (1940), p. 148.

[11] Bronfenbrenner: Op. cit., p. 38-42. Northway, Mary L. and Quarrington, Bruce: Depicting intercultural relations. SOCIOMETRY IX (1946), p. 334-339. Northway, Mary L.: A note on the use of target sociograms. SOCIOMETRY XIV (1951), p. 236-237.

obvious in this sociogram, also: first there is still a great deal of arbitrariness concerning the placing of the single individuals inside a special "ring", secondly consideration has been taken to only *one* sociometric variable in the construction of the sociograms.

In this paper we propose a new type of sociogram, one which will not only reduce the arbitrary treatment of the symbols of the individuals but will also make allowance for all six variables for sociometric classification discussed above. The principle of this sociogram is to allot each of the sixty-four sociometric types a fixed place in a "chess-board diagram", a square system with 8 x 8 squares. Jennings arranges her frequent tables in a similar way,[12] but she does not use the arrangement to make a sociogram. Nor does she attempt in her arrangement a systematical placing of rows and columns in order to locate similar types near each other. This is surely paramount in the construction of a sociogram. The mere placing of different individuals in different "boxes of types" cannot create the straightforward arrangement, the clarity of survey that is the aim of all sociographic methods. In practical work with these new sociograms it has seemed most appropriate to use two different types of chess-board diagram (or square sociogram), which I have called as a suggestion type I or the diagonal-varying square sociogram and type II or the centripetal square sociogram.

Type I: the diagonal-varying square sociogram.

Type I is the starting-point. Figure 1 shows its construction. In the left margin column the choice pattern is given, in the upper margin row the rejection pattern. In each small square is placed a sociometric type, whereby the three positive variables are read from the left and three negative variables from the top.

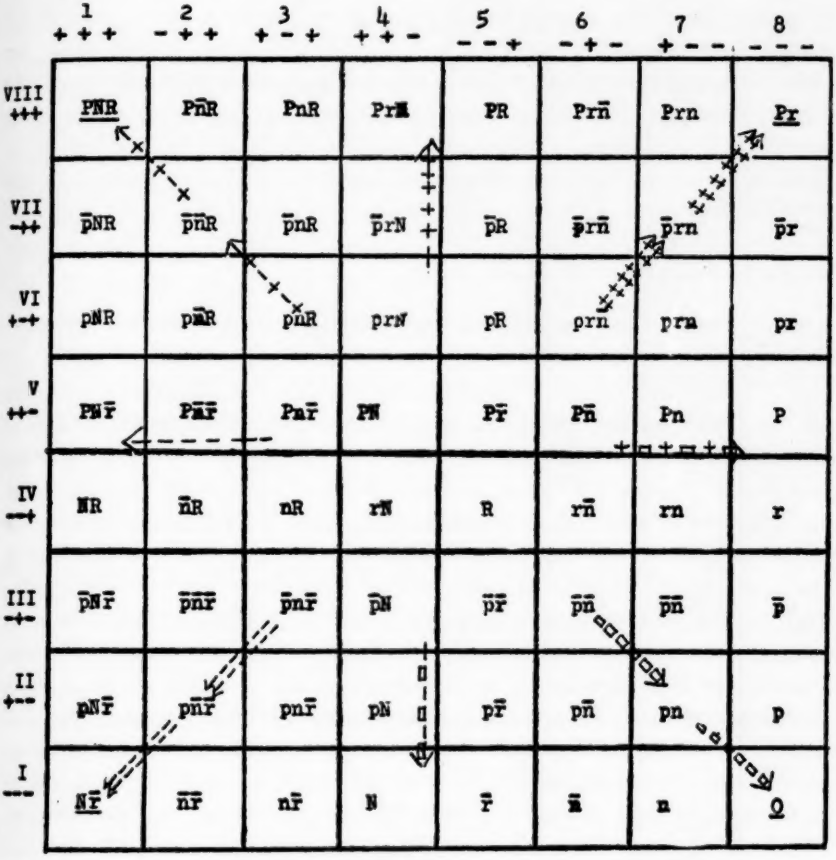
The positive patterns are so arranged that positive maximum is in the first row (high values in all positive variables) and positive minimum in the last (lowest) row (low values in all positive variables, i.e., the eight types which have high values in p, $\bar{p}$ and r are placed in the first row, the eight types with low values in p, $\bar{p}$ and r are placed in the last row. Between these two extremities the other variations as to the positive values are so arranged that where possible they constitute a scale with falling positivity from the top downwards. Row VIII has three high positive variables, the rows VII-V each two, the rows IV-II each one and row I no positive variables.

[12] Leadership and Isolation, p. 96-7.

The difference as to positivity between rows VII, VI and V is less obvious. Their mutual arrangement has been based on the following argument. Provided that an individual's own choices are reciprocated to a large extent, the degree of his own positive expansiveness is not so important for his sociometric position as the number of received choices. This means an order of precedence of the three positive variables: high positive reciprocation is put in the first place, a large number of received choices in the second and high positive expansiveness in the third place. It may be that this argument is not quite self-evident and that it should be empirically tested, it seems in all cases to have a greater logical probability than other possible orders of precedence and may without doubt be used in the construction. The positive pattern $--++$, where only positive expansiveness is lacking, is thus placed as the "most positive", $+--+$, where the high number of received choices is missing, as the most positive after that, while the constellation $++--$, where high degree of reciprocation is absent, is placed in the last place. The same argumentation decides the arrangement of the rows II—IV. High positive reciprocation ($---+$) comes first, high positive expansiveness ($+---$) last.

The negative patterns (rejection patterns) are arranged in a similar way so, that negative maximum is in column 1 (which thus contains the eight types which have high values in n, $\bar{n}$ and $\bar{r}$) and negative minimum in column 8 (which contains the eight types which have low values in n, $\bar{n}$ and $\bar{r}$.) The arrangement of column 2-4 and of column 5-7 is motivated in an analogous way as the arrangement of the corresponding positive patterns. The negative pattern $+---$, which indicates high negative expansiveness, is thus "not so negative" as the constellation $-+-$, which indicates high number of received rejections, and this lastly not so negative as the series $---+$, which indicates a large number of mutual rejections. In the same way $-++$ is more negative than $+-+$ and $+-+$ more negative than $++-$.

What this arrangement of rows and columns means to the total structure is clearly shown by the arrows in Figure 1. This type of square sociogram was called above the diagonal-varying type. This means that the most pronounced changes in the sociometric position of the types occur along the diagonals. When we move diagonally upwards to the right (in the direction of the doubleplus-arrows), we meet types with higher and still higher positivity and lower and still lower negativity. The cell VIII:8 with type Pr (pattern $+++----$) indicates positive purity maximum. When we move in the opposite direction (i.e., diagonally downwards to the left



− − − − − → towards greater negativity

= = = = = → " negative purity maximum

+ + + + + → " greater positivity

+ + + + + → " positive purity maximum

+ − + − + → " greater general (ambivalent) intensity/intensity maximum/

□ □ □ □ □ → " lower general intensity/intensity minimum/

FIGURE 1
THE CHESS-BOARD SOCIOGRAM
TYPE I

in the direction of the doubleminus-arrows), we meet types with lower positivity and higher negativity. Negative purity maximum is in the cell I:1 with type N$\bar{r}$ (pattern $---$ $+++$). If we move instead along the other diagonal upwards to the left, we reach types with higher positivity simultaneously with higher negativity. A general (ambivalent) intensity maximum is represented by type PNR in the cell VIII:1 (pattern $+++$ $+++$). If we move diagonally downwards to the right—i.e., in the opposite direction—we meet on the other hand types with lower positivity simultaneously with lower negativity. A general intensity minimum is the 0-type in the cell I:8 (pattern $----$ $----$).

Type I used as "sociomotion diagram": multidimensional analysis of sociometric positions and locomotions on the chess-board sociogram.

It is very important in stability examinations—the re-tests—to analyze not only the general stability of the sociometric variables with the help of correlations and the changes of the single choices but also the changes of the sociometric position of single individuals. The coefficients of correlation are here only of preliminary character: they show if we may expect stability or not in general, but they do not show the special nature of the existing changes of position. Here as often in other cases the synthesis of the statistical character is too schematic to be quite psychologically productive. A good help is given in what we might call a *curve of position* for each test, where every individual has a position in the curve according to his number of received choices. It is however not altogether profitable to rest satisfied with an unidimensional analysis of the changes of individual position, though perhaps the dimension mentioned may be the most important. A multidimensional analysis is easily made with the help of our square sociogram type I, which in this application—perhaps the most important—might also be called a "sociometric locomotion diagram" or more briefly a *"sociomotion diagram"*. By representing the individual changes of position on the different occasions of tests as movements on the chess-board diagram we receive quite a good picture of how constant the general sociometric position of the single individual is and of the special character of the changes. We might speak of the "sociometric locomotions (or sociomotions) on the chess-board diagram"; this means then a sort of resulting locomotion, which does not indicate towards which individuals the person moves, but which indicates the transition from one role, one relative position in the structure of the group, to another one.

We speak about one sociometric position as *not* very *good*, if its positive

variables are low and its negative variables high, and about another as *better*, if its positive variables are high and its negative variables low. It is clear, that we should use these terms cautiously and not give them too general a character. We should refer to changes in the test position without meaning that these changes are necessarily psychologically relevant (even if this nevertheless of course is highly probable for *great* changes). In order to lay stress upon this operationalistic meaning of the concept we should speak about *sociometric* improvement, *sociometric* impairment. As a comprehensive term for this way of regarding the sociometric position is needed, we here suggest and subsequently use the expression the *"sociometric bonity"* of the position, i.e., its "sociometric degree of goodness" (cf. Latin "bonitas").

Suppose that we want to visualize three sociometric tests in a certain group. We then indicate the six-dimensional position of the individual at the first test by placing in the type cell in question e.g., a small red circle with the number of the individual; the position at the second test may be indicated by a green circle and at the third test with a blue. The movements are represented by arrows.

The sociometric bonity of the changes of position (the bonity of sociomotion) is then clearly indicated by the directions of the arrows and may be represented as follows:

A. *Towards higher numbers of rows or columns: relatively higher sociometric bonity, i.e., sociometric improvement.*

1. directly upwards (towards higher Roman figures): higher positivity with maintained degree of negativity.

2. directly to the right (towards higher Arabic figures): lower negativity with maintained degree of positivity.

3. diagonally upwards to the right (towards higher figures of both kinds): higher positivity simultaneously with lower negativity.

B. *Towards lower numbers of rows or columns: relatively lower sociometric bonity, i.e., sociometric impairment.*

1. directly downwards (towards lower Roman figures): lower positivity with maintained degree of negativity.

2. directly to the left (towards lower Arabic figures): higher negativity with maintained positivity.

3. diagonally downwards to the left (towards lower figures of both kinds): higher negativity simultaneously with lower positivity.

C. *Towards higher numbers of rows and lower numbers of columns or towards higher numbers of columns and lower numbers of rows: change of bonity non-existent or uncertain.*

1. diagonally upwards to the left: higher positivity *and* higher negativity (more disputed and ambivalent; greater general intensity).
2. diagonally downwards to the right: lower positivity *and* lower negativity (lower general intensity).

In the practical test situations we often find many persons (sometimes 50% of a group) constantly maintaining the same sociometric type over a long period of time (e.g. a year). Those persons are not seldom positively pure types, negatively pure types or persons with low general intensity; i.e. we may often predict that those pregnant, well-formed choice constellations are *stability-disposing*. But we have also less "natural" (and at the same time exceptional) types—low expansivity together with high reciprocation etc.; those types seem very often to be *lability-disposing*.

We might speak of four fundamental categories of social types according to the degree and frequency of "*sociomotion*": *sociolabile, socioflexible, sociostabile,* and *sociorigid* types and operationally define them with the help of an analysis of the inter-temporal and inter-aspectal (i.e. inter-criterial changes). The expression *sociolabile* may be applied to the individual who, on a given number of (occasions of) tests with a certain number of choice aspects (criteria), incessantly changes his choice-and-rejection pattern (his sociometric type). *Socioflexible* describes the individual who often changes inter-aspectally, seldom inter-temporally; *sociostabile* describes the individual who seldom changes type, either inter-aspectally or inter-temporally, and *sociorigid* the individual who never changes type. In every special case we must of course decide in relation to the number of aspects and tests used what is to be interpreted as often and seldom. When we use only one aspect but repeat the test a number of times it is often quite sufficient to speak about sociostabile persons (who do not change) and sociolabile persons (who change incessantly).

Type II: The centripetal square sociogram.

If the square sociogram type I has great advantages in sociomotion analysis, it has certain disadvantages in ordinary sociographic description of choice directions with the help of arrows. Thus the placing of the type Pr—a much chosen type—sometimes involves a certain technical difficulty in the drawing of the arrows: the accumulation of choices to a peripheral cell as VIII: 8 causes a certain difficulty in surveying the choices which usually come from all parts of the square sociogram. The chess-board diagram type II tries to manage this difficulty. The principle of its construction has been to rearrange the rows and columns so that the pure positive types

acquire a central position, while the pure negative and the low positive types receive a peripheral position. The centripetal square sociogram has of course received its name since the most chosen types—as in Northway's target diagram—are placed at the center. This has been done in such a way that the two most positive rows (VIII and VII) have been placed at a middle level (at which the numbering from type I has been maintained for simplicity, see figure 2). At the same time the two least negative columns (8 and 7) have been placed centrally in the same way. Thus a cross, formed by these four arrays, is discerned. The four-cell field in the middle of the cross

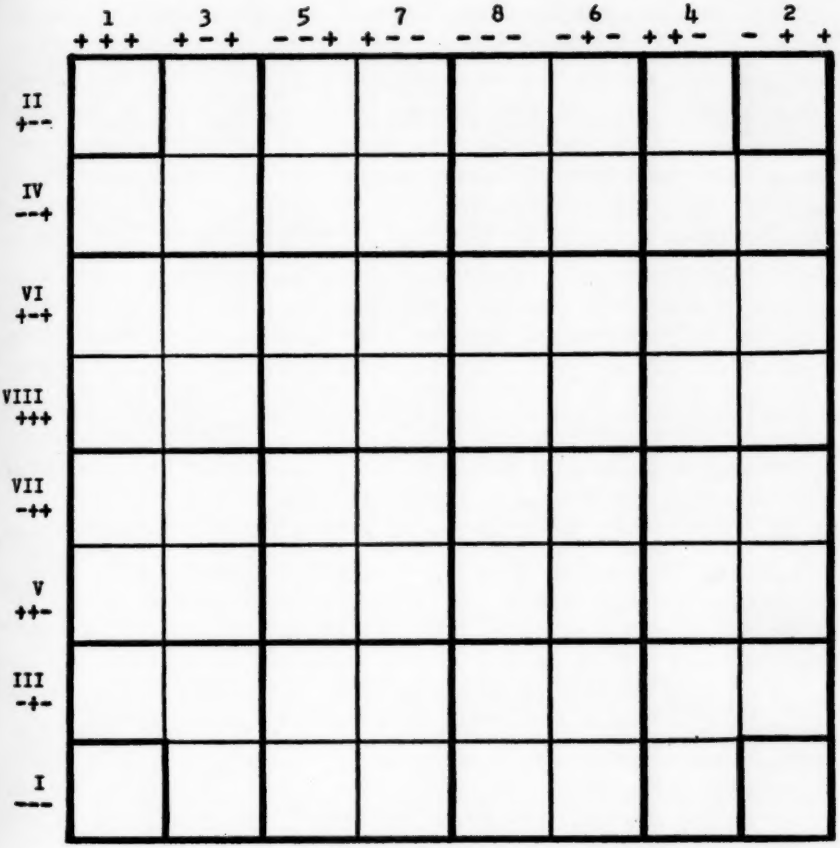


FIGURE 2
THE CHESS-BOARD DESIGN
TYPE II

represents positive purity maximum (with the types Pr, $\bar{p}r$, $\bar{P}rn$ and $\bar{p}rn$), where the upper cell to the right with type Pr of course is the absolute purity maximum, while type $\bar{p}r$ implies a weakening of the least "essential" positive variable, type Prn a "defiling" through addition of the weakest negative variable and type $\bar{p}rn$ both a positive weakening and a negative addition. For all those four types it is true, however, that the number of received choices and reciprocated choices is high and the number of received rejections and reciprocated rejections is low. The variations have only reference to the own positive or negative expansiveness.

The two most negative columns (1 and 2) have been placed peripherally farthest to the left and to the right. The two least positive rows (I and II) have also been given a peripheral position at the top and at the bottom. The remaining rows have been arranged so that an approach to the center implies higher positivity. In the same manner the remaining columns have been allotted such a position that a withdrawal from the center means higher negativity (both according to the order of precedence of the variables discussed above in connection with type I). When we move from positive purity maximum along the diagonals, we meet in all the four possible directions types with lower positivity simultaneously with higher negativity. Negative purity maximum is represented by the four corner cells (with the types $N\bar{r}$, $\tilde{n}\bar{r}$, $pN\bar{r}$ and $p\tilde{n}\bar{r}$), where of course the cell I:1 with the type $N\bar{r}$ is absolute negative purity maximum, while type $\tilde{n}r$ in cell I:2 implies a weakening of the negativity, type $pN\bar{r}$ in cell II:1 a "defiling" of the negativity though addition of the weakest positive variable and type $p\tilde{n}\bar{r}$ at last in cell II:2 both a weakening of the negativity and a positive addition. For all the four types it holds good, however, that the number of received choices and reciprocated choices is low, while the number of received rejections and reciprocated rejections is high. The variations fall only—quite as concerning the four pure positive types—on the own positive and negative expansiveness.

If we move from the center to the left or to the right, we meet types with maintained maximal positivity simultaneously with higher negativity. Thus, we move here towards higher general (ambivalent) intensity (intensity maximum types being placed in the center of the peripheral columns: PNR—absolute intensity maximum in cell VIII:1—$\bar{p}NR$, $P\bar{n}R$ and $\bar{pn}R$). If we instead move from the center upwards and downwards, we meet types with maintained minimum negativity simultaneously with lower positivity. Thus we move in this case towards general low intensity. Inten-

sity minimum types are the 0-type, the n-type, the p-type and the pn-type, which were therefore allotted their place in the center of the peripheral rows (absolute intensity minimum of course represented by the 0-type in cell I:8).

Some possible modifications.

In order to take into consideration the fact that a priori certain irregularities of distribution may be expected, it may often be suitable to make certain modifications of size when using the chess-board diagram as an ordinary sociogram. Figure 3 shows one possibility. Here the columns 7 and 8 (the *least* negative) have been made wider than the columns 1-6, because the number of individuals with great negativity is usually relatively limited. In the same way we may predict that the types in rows IV and VI, which contain the combination relatively high positive reciprocation (above M and low number of received choices below M), and the types in the rows III and V, which contain patterns with relatively high number of received choices and relatively low positive reciprocation, will be more uncommon than those in the rows I, II, VII and VIII. The latter rows with their more "natural" combinations have thus been made wider. Moreover, figure 3 shows the choices of group leaders in a school class of ten-year boys.

The diminished arbitrariness that the square sociogram or chess-board diagram implies does however also mean a diminished freedom of arrangement and thereby also a greater difficulty to arrange a great number of choices surveyably. If we want to draw many arrows it may therefore in some cases be suitable to use a "softened" (differentiated) modification of type II. Such a dedifferentiation may be done so that only certain boundaries of rows and columns are maintained. It is most convenient in the first place perhaps to maintain the more heavily drawn lines in figure 2 and 3 while breaking up the other, which implies that 2-5 proximal types are unified and we obtain 17 larger fields instead of rangement, but the square sociogram would still in this differentiated 64 smaller. This would imply greater freedom of movement in the arrangement, but the square sociogram would still in this dedifferentiated form give more distinct information than the traditional sociograms. The unmodified form of the type II may be of good use when we are not very interested in drawing many choices: when we are satisfied with the first choice or with mutual choices. It must be remembered moreover that while a sociogram of the original type *without symbolized choices* does not say anything about the individual and therefore in such a condition is meaningless, and while a target diagram during the same circumstances gives only *one* piece of information about the individual, then one of the obvious advantages with the square sociogram is the one, that without symbolized choices it gives exact information for each individual about no less than six essential conditions. This of course does not mean that the special choice-directions are non-essential. On the contrary, we find the sociogram being of best use, when it gives both

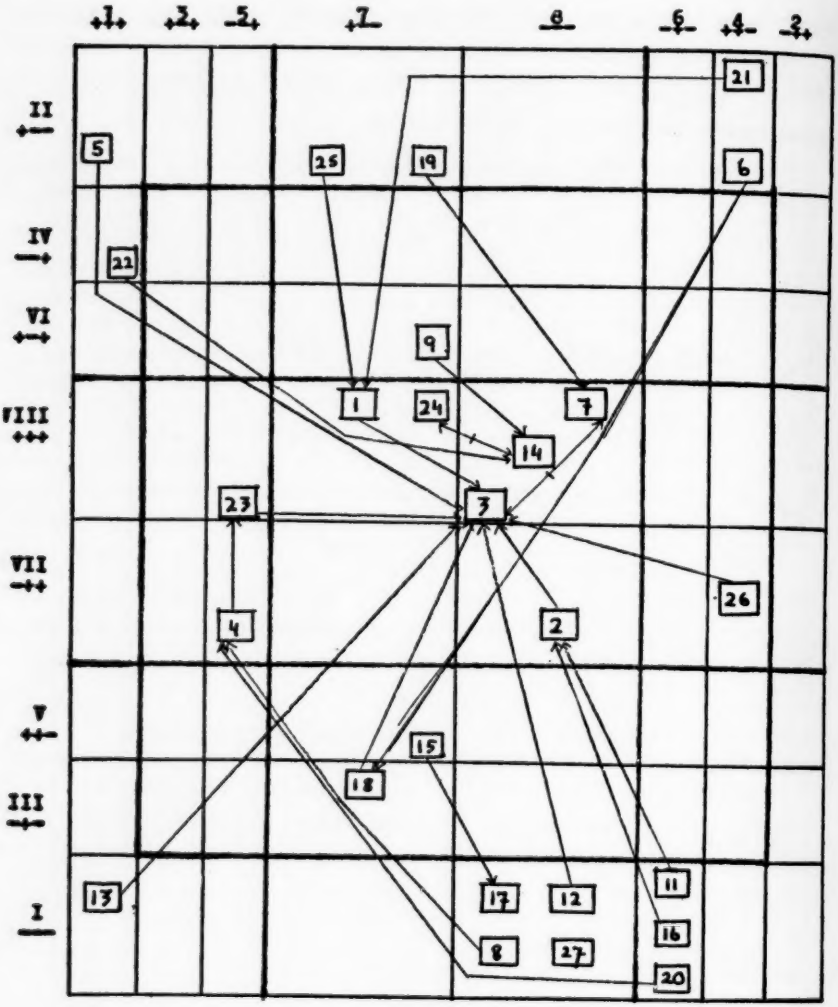


FIGURE 3
THE CHESS-BOARD SOCIOGRAM—TYPE II MODIFIED
CHOICES OF GROUP LEADERS IN A SCHOOL CLASS

special choice-directions and a general picture of the relative sociometric position of the individual in the group).

If in some cases a dedifferentiation will be of good use, in other cases an additional differentiation may seem convenient. This is most often true for type I. It may be argued that the division of

the distribution (as to each of the six variables) is too little differentiating: the distribution is only divided into two parts—the values above and below the mean. Moreover, this division in two parts (which we have taken over from Jennings' choice-and-rejection patterns) often brings about an easy transition from one type to another, because there are a great number of individuals in the immediate proximity of the mean. Therefore it may be replaced in some cases by a division of the distribution into three parts: the values above + 1 S.D., the values between + 1 S.D. and — 1 S.D., and the values below — 1 S.D. In the choice-and-rejection patterns we then obtain not only + (for the upper values) and — (for the lower values) but also o (for the middle values between + 1 S.D. and — 1 S.D.). If we want to use the alternative letter description of the types, we then have to use a new principle: while the using of the symbol means a value above + 1 S.D., and the not-using means a middle value, the values below — 1 S.D. have to be symbolized by the letters preceded by minus. Our square sociogram will be a good deal more complicated: instead of a cell system of 8 x 8, we will have a cell system of 27 x 27; but the principles of arrangement will be quite the same, placing the extreme types in the corners, the most positive at the top, the least positive at the bottom, the most negative to the left and the least negative to the right. The series of patterns will be the following: + + +; 0 + +, + 0 +, + + 0; 0 0 +, 0 + 0, + 0 0, — + +, + — +, + + —; — 0 +, — + 0, 0 — +, 0 0 0 + — 0, 0 + —, + 0 —; — — +, — + —, + — —, — 0 0, 0 — 0, 0 0 —; — — 0, — 0 —, 0 — —; — — —. The field of 729 cells will not in spite of its largeness be very confusing thanks to the systematic arrangement. The large field in reality is clearly divided up into nine parts: the highly intensive types, the pure positive types, the pure negative types and the lowly intensive types in each of the four corner-fields; and the remaining five parts, together forming a cross, being filled up with middle types: pure middle types (at the center), highly positive middle types (at the top), lowly positive middle types (at the bottom), highly negative middle types at the left and lowly negative middle types at the right. This modified form may be of good service in sociomotion analysis, but it is too differentiated to be used when we want to draw a large number of choice-arrows.

Sociometric profiles ("socioprofiles") as means of completing the analysis of sociometric types.

This kind of typology which has been discussed above in close association with Jennings' choice-and-rejection patterns has not only an advantage over the unidimensional division of categories so often used by sociometrists, in its simultaneous consideration of several different variables, but also an advantage over the more intuitively formed socio psychological or sociological type-systems in that the types here discussed may easily be quan-

titatively analyzed. If we say that the ordinary sociometric types have been established by a pure alternative procedure, i.e., by indicating that a value of a variable either is or is not above the mean, so this fact does not mean that all individuals of the same type are identical as to the variable in question, only that for a certain end (in order to win simplifying surveyability or in order not to "metrify" more than is psychologically significant, etc.) we have left out of consideration the further graduation of the variable. From this it follows that the possibility of going from an *alternative* to a *graduating* proceeding is always left open, when *this* is considered *more* desirable for one reason or other. Thus, when it is desired, the differences as to type may easily be analyzed as differences of degree in the six different variables. As soon as we suspect that the typology in one respect gives a picture which is too crude and on account of arbitrary boundaries too insufficient for the special aim of our investigation, we may "translate" the type into a more exact language—e.g., to what we might call a *sociometric profile formula* (of *socioprofile formula*). Jennings has not followed this course of action for her choice-and-rejection patterns as far as I know, but Smucker[13] has established a series of formulas for sociometric indices, among which also are formulas for all the six variables in question. A sociometric profile which uses his indices has the disadvantage, however, that individual values which incessantly lie on or near the mean give a very broken profile in the cases—and these cases are very common indeed—where the means of the different variables are of different height. For graphical visualization it will often therefore be more advisable to calculate the deviation of the single value from the mean and divide this deviation with the dispersion of the distribution, i.e., to calculate comparable, standardized values. In order to avoid minus signs we have the possibility in the traditional way to transform these values into standard scores with the mean arbitrarily placed at 50 and one standard deviation given the value of 10 according to the formula[14] $\frac{(x - M)\ 10}{6} + 50.$

A sociometric profile formula then consists of a series of standard scores for the different variables. This may easily be graphically visualized. Often it is unnecessarily exact and may be shortened or rounded off: instead of

[13] Smucker, Orden: Near-sociometric analysis as a basis for guidance. SOCIOMETRY XII (1949), p. 326-340.

[14] See e.g., Greene, Edward B.: Measurement of human behavior. (New York 1941), p. 59-60.

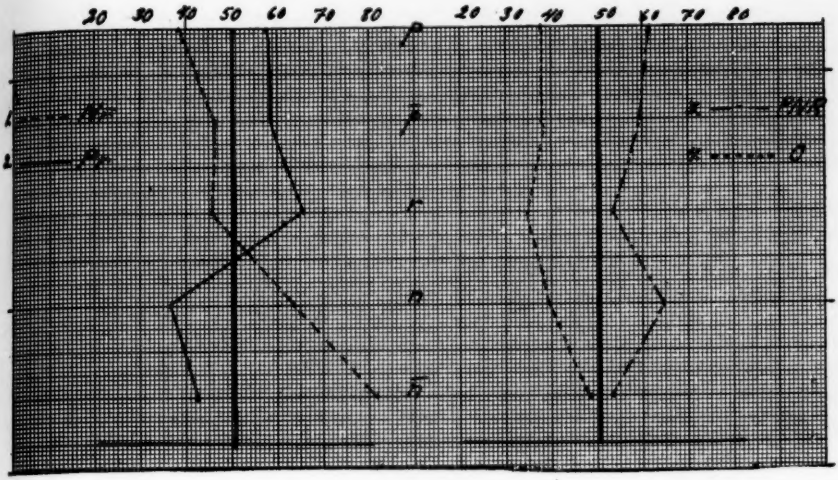


FIGURE 4

SOCIOPROFILES

1. type Nr̄
   Spf I — — — + ++
   Spf III 34-4-68
   Spf IV 38, 6-46, 5-/45, 3/-63, 6-81, 1
2. type Pr
   Spf I + + + — — —
   Spf III 55-6-34
   Spf IV 57, 6-58, 5-/65, 3/-36, 4-42, 2
3. type PNR
   Spf I + + + + + +
   Spf III 65-5-65
   Spf IV 61, 2-59, 1-/53, 8/-64, 2-53, 5
4. type 0
   Spf I — — — — — —
   Spf III 33-3-34
   Spf IV 37, 6-38, 0-/35, 0/-39, 2-48, 5

N. B. In Spf III and IV above (and in the picture) the values of r̄ are not given, because of the low number of reciprocated rejections in the group. The values of Spf III are then grouped p̄p̄-r-n̄n̄ and the values of Spf IV p̄-p̄-/r/-n-n̄.

writing 37,5 we use only 3, instead of 45,0 we write 4 etc. In certain respects we may also consider the choice-and-rejection pattern as a profile formula—i.e., as a profile formula of the crudest type, which only indicates if the values are above or below M. It is often advisable to speak about profile

formulas of four different degrees of accuracy: Spf I (socio-profile formula, type I), which is identical with the ordinary choice-and-rejection pattern; Spf II, which is the same as the more differentiated pattern discussed above; Spf III, which gives the standard scores rounded off (cf above and the text, figure 4; the figures grouped e.g., p̄p̄r-nn̄r); and Spf IV—the most exact values (the ordinary standard scores, grouped e.g., p-p̄-r/n-n̄-r). Figure 4 shows sample socioprofiles for some extreme types. The chess-board sociogram and the socioprofiles are then able to complete each other: with the modifications of both discussed above we have the possibility of choosing for almost every occasion the degree of accuracy we require.

A SYNTHESIS OF TIME SAMPLING AND SOCIOMETRIC TESTING

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Introduction

According to Arrington, time sampling is . . . "a method of observing the behavior of individuals or groups under the ordinary conditions of everyday life in which the observations are made in a series of short time periods so distributed as to afford a representative sampling of the behavior under observation. . . . As contrasted with the experimental method, it is a form of controlled observation in which the observer, the method of recording, and the manner of selecting the behavior to be observed are subject to control rather than the situations in which the observations are made. . . . It is a method whose essential function is accurate measurement of the incidence of specific behavioral acts or patterns under specified connditions."[1]

Typically, time sampling is used in the observation of groups to determine whether various classifications of the members, e.g., by sex, age or psychological traits, show class differences with respect to predetermined types of overt behavior.[2] More recently, it has been applied in the study of group dynamics to evaluate the effect of certain carefully arranged emotional situations upon the behavior of members of a group toward one another.[3]

If a method can be found for time sampling an item of behavior which implies interpersonal relationship, it is suggested that this technique, together with the sociometric test, might be used to study the primary group simultaneously from two important frames of reference. On the one hand, time sampling could be expected to reveal the interpersonal relationships within the group as they present themselves in day-to-day activity. It would represent the group from the point of view of an observer (a teacher, for example) who is watching the interaction of the members of the group while it is actually functioning. It would characterize what might be called the "physical" group.

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[1] Arrington, Ruth E., "Time Sampling in Studies of Social Behavior: A Critical Review of Techniques and Results with Research Suggestions," *Psychological Bulletin, 40,* 81-124 (1942).

[2] Cf., Goodenough, F. L., "Inter-relationships in the Behavior of Young Children," *Child Development 1,* 29-49 (1930).

[3] Cf., French, J. R. P., "The Disruption and Cohesion of Groups," *Journal of Abnormal and Social Psychology, 36,* 361-77 (1941).

The sociometric test, on the other hand, could be assumed to reach, at least in part, into the network of emotional relationships which have their reality in the perceptual sets through which each member sees himself and his fellows in the group situation. For a given moment, it would sample the continual readjusting process by which each member seeks for rapprochement between his perception of his own place in the group and what he surmises to be the reciprocal perceptions of him from all other members. It would represent the "attitudinal," "emotional," or "perceptual" group.

It is the purpose of this paper to show, in the example of a simple experiment, that the physical and emotional group can be characterized, and that the examination of the regions of congruence and disparity between the two groups leads to understandings of the group structure and the positions of individuals in it which the sociogram alone only partly reveals.

The Experiment

A situation was developed in a ninth grade physical science class of a private secondary school such that the children were required to work in small groups to complete a project as a part of a unit on light. The teacher (the writer) suggested that each person in the class might write down the names of the three people with whom he would most wish to work, and that the groups could be arranged on the basis of these choices. The class agreed to do this and filled out their choice-cards during the class meeting of the following day.

The choices were tabulated on a matrix-like score sheet and regrouped as shown in Table 1.[4] On the basis of the regrouped data, a sociogram was drawn (Figure 1).

Several days later, during a class period devoted to simple experiments with lenses, the children were given work-sheets which were to be filled out from their observations with the equipment which was provided. Since there were more children than separate pieces of equipment, it was explained that they would probably find it most convenient to work in groups, but that they should feel perfectly free to change groups or get help from others whenever necessary. (The latter instruction was hardly needed since the "climate" of the class was, and had always been, highly informal and permissive.)

TABLE 1.

[4] Cf., Bock, R. D., and Husain, S. Z., "An Adaptation of Holzinger's B-Coefficients for the Analysis of Sociometric Data," Sociometry, *13*, 146-53 (1950). (This method of analysis orders the matrix of choices in such a way as to reveal subgroups.)

TABLE 1.
PREFERENCE CHOICES

A \ B		MK	RJ	JH	VS	AP	JC	RA	GF	AK	WG	DT	WW	MD	MP	BR	GZ
1. MK	♀		1	3	2												
2. RJ	♀	1		2	3												
3. JH	♀	1	2			2											
4. VS	♀	2	1	3									3				
5. AP	♀	1		2													
6. JC	♀	3	1	2													
7. RA	♂								2	1		2					
8. GF	♂							1					3		2		
9. AK	♂							1	3		2						
10. WG	♂								1	2		2					
11. DT	♂							1			3		2				
12. WW	♂							3			1			2			
13. MD	♂							3			2		1				
14. MP	♂							1			3		2				
15. BR	♂							1	3	2							
16. GZ	♂							1	2	3							

Rows: A chooses B
Columns: B is chosen by A
Underscored: Mutual choices

From the moment the first two children had entered the classroom, and before the above announcement had been given, an observer who knew the children by name, and was known to them, was seated at a table commanding a view of the entire room. The observer had before him a ruled sheet of paper with the names of the students listed at the left margin. Every minute as the class proceeded, he indicated the pupils who were interacting during the preceding sixty seconds by marking successive columns on the sheet with the same letter for those pupils who were interacting. For example, "a" represented RA and all those with whom he was interacting at a given time, "b" represented JC and his interactors, and so on. Thus in the second minute RA, AK, and GZ, interacted. In the fourth minute, RA interacted with BR and RJ with VS.

"Interacting" was taken to mean speaking together, doing something cooperatively, or in some way having attention fixed on one another. The distinction between interacting and not interacting proved sufficiently clear to give the observer no difficulty in recording the data. The interaction record sheet is reproduced in Table 2.

For each pair of persons the number of interactions was counted from Table 2 and expressed as a per cent of 55, since that represented the maximum possible number of interactions per pair for the 55 minutes that the children were in the classroom. The result is shown in Table 3, which is of course, symmetrical about its main diagonal.

From Table 3, an "interaction" sociogram was drawn using the same arrangement as the sociogram of Figure 1. The markedly high values in Table 3 were picked out and underscored, and were represented as equivalent to mutual choices when the interaction sociogram was drawn. These values will be referred to as "primary associations," and the remaining values as "secondary associations." Two-headed arrows were used throughout the drawing because "associations," unlike choices, are non-directional. The interaction sociogram is shown in Figure 2.

From the two sociograms, Figure 1 and Figure 2, the physical and attitudinal realizations of the group were compared.

TABLE 2.

Interpretation

Considering the pattern as a whole, it is clear that the sex-cleavage stands in the classroom interaction as it did in the sociometric choices. Like the mutuals, primary associations do not cross sex lines. The secondary associations, however, show a good deal more relationship between the girls and the boys than they were willing to express in explicit choice. The

TABLE 2.

INTERACTION RECORD SHEET

	Minutes 10	20	30	40	50	60
1. RA	a a a aaa aa a aaaaaaaaaaaaa a			aaaaaaaaaaa	aa	
2. JC	bb bbbb bbbbbbb		b bb	bbbbbbbbbbbbb	bb	
3. MD	ccc cc ccccccccccccccccc		cbc	ccccccc	ccc	
4. GF	d dd dd dd dd addddddddddddd		d	dd a bbbbda	d	
5. WG	—— —— —— absent ——			——	——	
6. JH	—— —— —— absent ——			——	——	
7. RJ	e eee ee eeeeeeeeeeebee		ee e ebbeeaa	ae eee eeee		e
8. MK	feee ee eeeeeeeeee		ee ee e ebbeeaa	fceffeefeeee b		e
9. AK	ad dd dd dd a dd ddddddddddddg		d	dd a	d d	
10. MP	—— —— —— absent ——			——	——	
11. AP	fe e e eeeee eeee ee e		e ebbeeaa	fceffeefeeeebb		
12. BR	a a aii ii iiiiiiiiiiiiiiiii		i	i i i	i ii	
13. VS	e bb bbbb bbbbbbb		b	bbbbbbbbbbbbb		
14. DT	a aaa aa aaaaaaaaaaaaa		ag	aa aa aaa	a	
15. WW	ccc cc ccccccccccccccccc		c c	cccfcccc	ccc	
16. GZ	a ii ii iiiiiiiiiiiiiiiii		i	i ia eibbbi	ii	

TABLE 3.
INTERACTION SCORES

		MK	AP	RJ	JC	VS	MD	WW	GF	AK	RA	DT	GZ	BR	JH	WG	MP
1. MK	♀		68	63	06		04				04						
2. AP	♀	68		50	02		04	02			04						
3. RJ	♀	63	50		02	04	02				06	02					
4. JC	♀	06	02	02		54	02		07				06				
5. VS	♀			04	54												
6. MD	♂	04	04	02	02			68					02				
7. WW	♂		02				68										
8. GF	♂				07	07				52	06		06				
9. AK	♂								52		06		02				
10. RA	♂	04	04	06					06	06		54	06	06			
11 DT	♂			02			02			02	54			04			
12. GZ	♂				06	06			06		06			54			
13. BR	♂										06	04	54				
14. JH	♀						absent										
15. WG	♂						absent										
16. MP	♂						absent										

Underscored: Primary associations

Circles:
Triangl
Dotted
Shaded

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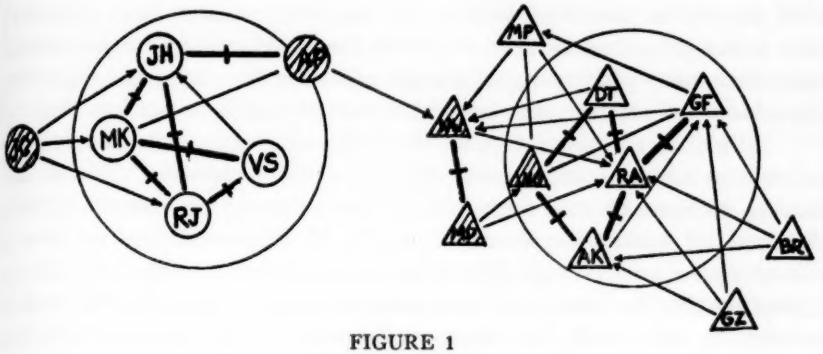
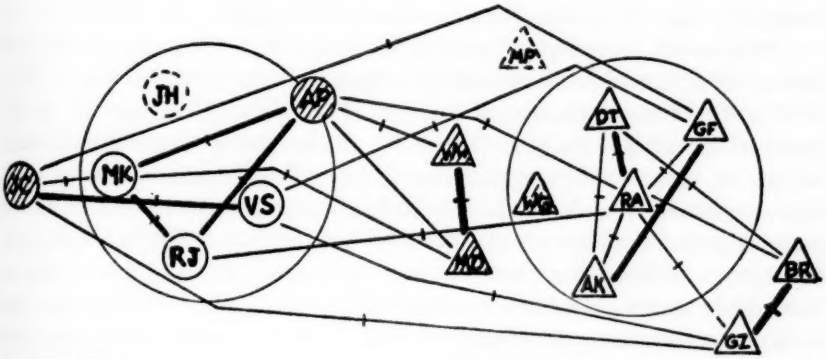


FIGURE 1
CHOICE-SOCIOGRAM



Circles: Girls
Triangles: Boys
Dotted figures: Absent
Shaded figures: Negro

Heavy lines: Mutuals and primary associations
Black lines: Unreciprocated choices and secondary associations

FIGURE 2
INTERACTION-SOCIOGRAM

criterion upon which the sociometric choice was based would have required that the children do a good deal of work together, some perhaps out of school. It was a situation demanding a degree of intimate cooperation too great for the social maturity of these children. Probably they sensed this and were realistic enough to choose largely within sexes. In the actual physical situation of the classroom, however, the social-sexual overtones of interacting together were not great enough to bar the children from contacting one another in at least a cursory way. But even in this situation, however permis-

sive the teacher had tried to make it, the children must have considered that working together for a large part of the period was a stronger commitment than a boy and a girl should make under the circumstances, and, hence, the absence of primary associations between the sexes.[5]

Within the subgroup of girls a rearrangement occurred in the classroom interaction which is only partly implied in the sociometric choices. The leading members of the subgroup from the standpoint of mutuals received, MK and RJ, remain together, but draw in AP, who was linked to them in the sociogram only through JH. This is somewhat interesting since JH was absent the day the interaction experiment was held. It suggests that a chain of mutuals does imply, as Moreno supposed, a relationship between two persons who are related only through mutual choices with a third. The unchosen person, JC, associated with the formerly central person VS, even though JC had not chosen her in the sociometric test.

Within the subgroup of boys, if WG and MP's being absent is taken into account, the interaction pattern is largely similar to the choice pattern. WW and MD remain a mutual pair set off somewhat from the rest of the group and relating to the girls through AP. Although the mutual relationships within the core of the subgroup break in two in the primary associations, the associations remain inside the core and the marginal persons remain marginal. The situation of the unchosen boys, GZ and BR is particularly interesting: When the sociometric test was made, they must have been at least dimly aware that they were outside the social core of the boy-group within the classroom. In the sense that minorities need solidarity, these boys needed one another. If they had had between them the security of a sincere relationship, as did WW and MD, for example, their integration into the core might have been facilitated. But for each of them to choose the other would have demanded an admission of their own unacceptable marginality, and their self-protection from this admission was the completely unrealistic choice of precisely the same persons of very high status, viz., AK, RA, and GF. In the classroom interaction, on the other hand, this pair had the choice only of working together or working alone. Their primary association in Figure 2 shows that the former must have seemed to them the lesser of two evils; hence, they worked together and made at least secondary associations with the persons whom they looked to in their sociometric choices.

[5] The question may be raised whether the differences between choice sociogram and interaction diagram would have diminished if (a) the number of choice permitted were more than three, (b) other criterion in addition to the work criterion were used (*Ed.*).

It is suggested that the job of the teacher in regard to GZ and BR is clear. He must find situations in which they will not have to defend themselves, consciously or not, from the fact of their marginal position in the eyes of their classmates. When this is accomplished, they should be freed to accept their need for one another and find the way to a secure relationship. This relationship, in turn, should bring both the experience in relating to others and the measure of personal security with respect to others which effective group participation demands. The situation of these boys illustrates the possibilities of the double frame of reference proposed here in understanding and dealing with the interplay between the perception of the group within the individual and the reciprocal perceptions with which that person must deal.

Turning to the positions of individual persons in the group pattern, it is the similarities which are most striking. RA, the most chosen person, is also most interacted with. Whether others came to him or he to others, and whether the exchange was for help with the experiment or simply "social," is not known, but his central position in the group's regard and activity seems certain. The much chosen girls, MK and RJ, are also much interacted with, although they do not have as much cross-sex interactions as the girls of lower status. This is also largely true for the boys of high status. It suggests that status has meaning only with respect to the subgroup in which it arises, and, therefore, that the sociogram must be carefully grouped before it is interpreted. The only person to make a cross-sex sociometric choice, the girl AP, also shows the most cross-sex interaction. Although she is of the same age as the other girls, she may be a fast grower and actually ahead of them in interest in the opposite sex. Her grooming and demeanor were observed, in this regard, to approach adult standards more nearly than those of the other girls.

To conclude, it should be pointed out that the method of time sampling presented here is not limited to a single meeting of the group being studied. It can be carried on without limit and, for the purposes of analysis, broken into periods of any size over the minimum which the requirements of reliability would fix. The possibility is opened, therefore, to following the interaction of the group as it undergoes change with time and with different situations, just as the attitudinal relationships within the group can be followed by successive applications of the sociometric test under varying criteria. The relative success of this two-fold approach to the study of the primary group as it has been illustrated in the preceding experiment seems to support the efficacy and practical worth of the technique.

A STUDY IN EGO FUNCTIONING: ELIMINATION OF STABLE ANCHORAGES IN INDIVIDUAL AND GROUP SITUATIONS*

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INTRODUCTION

This study attempts to investigate the effects of various conditions of situational uncertainty on ego functioning through simple judgmental reactions. By situational uncertainty we mean a stimulus situation surrounding the individual which lacks stable spatial and other anchorages, consequently, making it impossible or hard for the individual to determine his bearings in relation to objects and individuals in the situation.

This is not a study of judgmental process *per se*. The fundamental conceptual approach of studying attitudes, ego-attitudes, and other internal factors through "cognitive" processes such as judging, perceiving, remembering, etc., is becoming the main approach in the experimental study of these central topics of psychology.[1] The present study is an application of this general approach to the problem of anxiety or insecurity.

A number of experimental findings and observations of man's reactions under varying degrees of instability, confusion and chaos in life situations offer promising leads for testing recent theoretical formulations in ego psychology experimentally. The present study is regarded as a preliminary attempt in this direction. Since the experiment is developed from leads implicit in these experimental findings and concrete observations of life, implications of the experimental part acquire significance *only* against this background.

At this early stage of the development of ego psychology, which en-

* The study reported here was made possible by financial aid under a contract between the Office of Naval Research and the Research Institute of the University of Oklahoma. The authors are grateful to ONR, to Dean Laurence H. Snyder, director of organized research in the University, and to Dr. L. E. Swearingen, director of the Research Institute at the time of the main experiment. All experimental work reported here was carried out by O. J. Harvey. Preliminary work was done by D. Swander. Norman Walter participated in pre-testing trials of the main experiment. Charles Shedd made a survey of literature on anxiety which was useful in the writing stage. We are grateful to Professor Caspar Goffman, formerly of Oklahoma, now professor of mathematics at Wayne University, for advice and work in the treatment of results.

[1] This approach is well represented in references (4), (5), (8), (12), (14), (28), (29), (31), (32).

compasses problems of identifications with individuals and groups, problems of anxiety, security-insecurity, etc., it will be very immature to plunge into the abstractions of laboratory situations without a constant effort to relate relevant laboratory situations and life situations. Such a constant effort will be more than rewarding because by so doing we avoid the danger of finding mere artifacts, good only on paper, and can obtain valid findings which can be translated into the world of reality in life situations.

Some Relevant Experimental Findings

The reactions of individuals to stimulus situations with relatively little objective structure are largely determined by variations in social and internal (motivational, attitudinal) factors. For this reason the autokinetic situation is admirably suited for studying such variables experimentally. In the middle thirties, Sherif (28) showed the effects of certain social factors in judgments of extent of apparent movement and characteristic variations from subject to subject in distribution of judgments. The subject in the autokinetic situation finds himself in a room completely dark except for the periodic appearance of a tiny pinpoint of light. Since he has no way of knowing whether or not his judgments are correct, the subject feels uneasy (29, p. 107). Seated in the dark room, uncertain of whether or not he is reacting appropriately, "at times he feels insecure about his spatial bearing . . . some subjects report that they are not only confused about the location of the point of light; they are even confused about the stability of their own position." (29, p. 92)

When the individual's judgments of movement differ considerably from those of a prestigeful partner, he may, as in Sherif's study of attitude formation (30), become disturbed and uneasy, especially if no common norm is achieved or maintained. Murphy (23) has suggested that under these circumstances "the insecurity of the untrained observer, the need to see as a trained observer did, was the chief dynamic factor involved . . . " (p. 4).

In short, insecurity or anxiety of varying degrees is situationally aroused in the autokinetic experiment. In this unstable, uncertain situation, establishment of or convergence toward a common norm is accompanied by a reduction of these insecurity feelings (29, p. 110). As Kelman says, in his study of experimentally induced success and failure, "the establishment and use of a standard give the individual a basis for his judgments and therefore reduce his anxiety." (17, p. 279).

As Sherif's experiments showed, the individual facing the situation alone establishes a more or less characteristic range and norm for his judg-

ments; and individual variations in reaction to the judgments of others in a group situation are striking. In extending the work on individual characteristics, Bovard (7) found that changes in scatter and means between individual sessions and sessions with a prestigeful partner on the same day were highly correlated with the degree to which the social norm was carried over in an individual session four weeks later.

In the clinical area, pronounced individual differences have been found among various patients in mental hospitals by Voth (39). Patients in anxiety states were among those perceiving "more pronounced" movement. Following metrazol shock treatments, patients frequently show "very distinct reduction in movement." (p. 800)

Klein and Schlesinger (18) found significant quantitative and qualitative differences in reactions to apparent movement of forms among groups previously selected as "form-labile" and "form-bound" on the basis of criteria from Rorschach scores and protocols.

F. Schumer (27) showed that individuals who were found to be "movement oriented" on the basis of a Rorschach index revealed significantly less convergence toward a group norm in the autokinetic situation than "non-movement oriented" individuals.

In Kelman's study of "suggestibility" in the autokinetic situation (17), differential insecurity was produced experimentally by telling one group of subjects that most of their judgments in an individual session were correct, and another group that most of their judgments were incorrect. Individuals in the "success" group were subsequently less susceptible to the judgments of a "planted" subject than individuals in the "failure" group.

Implications of Observations from Life Situations for Our Problem

Experimental study must ring true to the characteristics of situations and behavior in the run of things in men's lives. For our problem we are specifically concerned with life situations of little structure, that is, situations with few stable anchorages. An example is the battlefield in modern, mechanized war. In his description of the modern battlefield, Marshall (20) wrote, "The harshest thing about the field is that it is *empty*. No people stir about. There are little or no signs of action. Over all there is a great quiet which seems more ominous than the occasional tempest of fire." (p. 44) This is in contrast to the recruit's expectations after being trained in the presence of great numbers of men and massive mechanical power all around him. But "he finds himself suddenly almost alone in his hour of greatest danger, and he can feel the danger, but there is nothing out there, nothing

to contend against." (p. 45) "There is nothing to be seen. The fire comes out of nowhere. But that is all that he knows for certain." (p. 47) As the men scatter under fire, they may even be out of sight of one another. And, as Vilfroy's account of the early days of the war in France (1940) puts it, he feels utterly alone, "forward and isolated." (38, p. 105)

Another example is the situation of soldiers on board ship, bound for an invasion. The present situation is clear-cut enough, but the future is unknown. It was Ernie Pyle's insightful observation that "I don't believe one of us was afraid of the physical part of dying. That isn't the way it is. The emotion is rather one of *almost desperate reluctance to give up the future.* I suppose that's splitting hairs and that it really all comes *under the heading of fear. Yet somehow there is a difference.* . . . When we huddled around together on the dark decks, it was these little hopes and ambitions that made up the sum total of our worry at leaving, rather than visualization of physical agony to come." (24, p. 4. Italics ours.)

As Stouffer *et al.* (35) indicated, the result of such situations is anxiety and insecurity for the individual. In behavioral terms, one fruit of such unstructured situations of stress is a decrease, at least temporarily, in behavior governed by group standards for action or by possible realistic requirements of the situation and an increase in behavior aroused by the individual's anxieties. Marshall (20) observed that as men spread apart under fire they move "Individually to whatever cover is nearest or affords the best protection." Some may use their equipment, timidly at first. Others do nothing, either because lacking instructions they don't know what to do or because "they are wholly unnerved and can neither think nor move in sensible relation to the situation." (p. 48) When the men cannot see one another under enemy fire, "all organizational unity vanishes temporarily. What has been a force becomes a scattering of individuals." (p. 129)

Those who have spent considerable time in prisoner-of-war camps report that the uncertainty of present and future life led frequently to increased individual fantasy and increasingly difficult relations with fellow prisoners.[2]

At a simpler level, Pyle (24) contrasted the behavior of infantry men, who were most exposed to continuing chaos and uncertainty even as to where and when they would sleep or eat, and sailors, who at least had a ship to call home. The sailors were "more like themselves. They didn't cuss as much or as foully as soldiers. They didn't bust loose as riotously when they hit town." (p. 3.)

[2] E.g. Vaughan (37) describing a civilian concentration camp in the Philippines, pp. 133-134.

The individual, in a situation having few or no anchorages to guide him, caught in the throes of anxiety, tries to establish some level of stability. He seeks to find some standard and is susceptible to accepting a standard from another source. Take, for example, the pilots preparing to take off from a ship before daybreak. On a completely dark deck, they must find their ships. "Old hands get used to memorizing the *relative positions* of all the planes the afternoon before the next morning, which helps." (40, p. 26.) It is a common enough observation that some conclusion to awaiting an indefinite future, even finally entering combat, may bring intense relief and stabilization, in spite of objective dangers in the certainty. (33, p. 4.)

Marshall (20) investigated the problem of why enemy fire against an advancing infantry line invariably caused a delay of from 45-60 minutes. His observations (of 11 infantry companies and one reconnaissance troop) led him to conclude that the line did not proceed until *effective communication* was restored. This might be simply one bold individual standing up and shouting "'Follow me! We're going on!" (p. 130.) If withdrawal becomes necessary, but is not coupled with some brief explanation (e.g. "Get the hell out of here and follow me to that tree line on the far side of the creek."), panic is likely to result.

In such stress situations, where the individual perceives only confusion, he may long for something or someone to provide standards of conduct. Thus soldiers caught in a hasty withdrawal of British forces after the breakthrough by Rommel's army in Libya, completely surrounded by confusion "bewilderment and fear and ignorance" *wanted* to receive orders (21, pp. 69-71). Here is the statement of a veteran wounded in the North Africa campaign: "One time we begged our lieutenants to give orders. They were afraid to act because they didn't have the rank. We took a beating while they were waiting for orders—how did they know the commander hadn't been knocked off?" (35, p. 117.)

In the absence of other anchors or standards for anticipating the future, men put their faith in the wisdom and experience of the captain of their vessel or the pilot of their plane (e.g. 24, p. 4; 25, p. 7). In such situations, the individual becomes increasingly dependent upon his own group for feelings of security (e.g. 35, p. 144; 20, pp. 129-130).

In short, the effect of extreme stress, uncertainty, lack of stable anchorages may be to increase suggestibility—in the sense of increasing the likelihood of accepting a standard for behavior from a source other than the individual's own. When shared with others, this increasing desire for some stable anchorage leads in group process to the rise and spread of *rumors*, as

the study and reports of rumor have amply shown (e.g. 2; 10; 19, p. 66; 26, p. 64; 24, pp. 9-10; 11, 107-109; 15, pp. 93-94; 6, p. 196; 37, pp. 133-34).

Rumor may, of course, be based on some specific event or action which is not defined for those watching. Marshall (20) who investigated the sources of panic which occurred in battle during World War II concluded that *in every case the "common denominator" was that "somebody failed to tell other men what he was doing"* (p. 146). Thus, in one case, a sergeant wounded during battle dashed back to a first aid station without telling his squad why. They took after him, and the rumor spread through the whole line, "The order is to withdraw."

The acceptance of an inappropriate or erroneous standard in a situation of intense stress and uncertainty often leads to panic. Turning to examples more familiar to social psychologists, it is no coincidence, as Cantril (9) pointed out, that the panic following Orson Welles' "Invasion from Mars" followed the tense, jittery days of the war crisis of September, 1938, while this country was still in a period of depression. Similarly, the "phantom anesthetist of Mattoon" Illinois (16) made his appearance during the war and predominantly among *women* of lower economic and occupational groups, many of whom (among those who responded) indicated trouble with "nerves."

The Theoretical Basis of the Study

The concepts of anxiety, insecurity, inadequacy, aloneness, etc., which all express personally felt, painful experiences of being out-of-tune, uneasy with oneself, have become at present central topics in the writings of authors seriously concerned with the plight of man living under the strains of the modern world. Such concepts are central in the analysis of modern man presented by Fromm, Horney, Murphy, Harry Stack Sullivan and others.

The present investigation is undertaken as an experimental approach to the study of some phases of ego problems. As recently stated by Mullahy in a symposium devoted to the topic of anxiety to which various authors contributed, there is no agreement as to what is meant by anxiety (22). For example, "some include fear under anxiety, others do not. This is no mere matter of terminology. Until we decide precisely what we are talking about, we can have little agreement on what causes anxiety, and what function or functions anxiety serves. . . ." (p. 44).

If there is no differentiating criterion between fear and anxiety, between fear and insecurity, or between fear and experience of aloneness, then in the interests of parsimony we should list them all under fear and not unneces-

sarily multiply terms in such a complicated area. We have, therefore, to justify anxiety, insecurity and similar concepts with some differentiating criterion. Traditionally some authors defined fear in terms of stimuli which are definite and identifiable, and anxiety in terms of indefiniteness of stimulus situations. If such were the case, the most convenient way to deal with the problem might be to speak of fears caused by definite stimulus situations and fears caused by indefinite stimulus situations.

It seems to us that the differentiating psychological criterion between fear on the one hand and such states referred to as anxiety, insecurity, etc., on the other hand, is furnished by those who study these problems in the developmental sequence of the individual.

Developmentally the appearance of fear in the human infant is prior to the appearance of anxiety. In order for anxiety to appear there has to be a certain degree of ego development. To this effect Harry Stack Sullivan (36) writes:

> Along with learning of language, the child is experiencing many restraints on the freedom which it had enjoyed up till now. Restraints have to be used in the teaching of some of the personal habits that the culture requires everyone should show, and from these restraints there comes the evolution of the self system—an extremely important part of the personality—with a brand-new tool, a tool so important that I must give you its technical name, which unhappily coincides with a word of common speech which may mean to you anything. I refer to ***anxiety.***
>
> With the appearance of the self system or the self dynamism, the child picks up a new piece of equipment which we technically call anxiety. Of the very unpleasant experiences which the infant can have we may say that there are generically two, pain and fear. Now comes the third (pp. 273-274).

Likewise, the state of *insecurity,* in a strict sense, does not appear until a certain degree of ego development in the form of formation of certain interpersonal ties has taken place. To this effect another insightful student of ego development and functioning (Ausubel) states: "Security needs, of course, cannot arise until some notion of self is formed and until the infant is mature enough perceptually to appreciate his executive dependence" (3, p. 333).

It seems to us that the above line of developmental observations gives us leads to make clear-cut differentiations as to the nature of anxiety, insecurity and the like. ***In such states there is always ego reference,*** whether it be conscious or not. The study of anxiety or insecurity, will lack its main component if the concept of ego is not brought into the picture and made

central in the handling of these problems. Hence our understanding of anxiety, insecurity will increase hand in hand with increase of our understanding of ego development and functioning.

A host of empirical observations leads us to define ego as a developmental formation or "sub-system" in the psychological make-up of the individual consisting of functionally interrelated attitudes which are acquired in relation to his own body, members of his family, social groups, objects, values and institutions which define and regulate his relatedness and hence behavior in so many concrete situations.

Ego consists of ego-attitudes formed in the life history of the individual defining, regulating his relatedness to situations, objects, individuals, groups, etc. His personal stability, personal security, then, consists of the stability and continuity of these relations defined and regulated by these developmentally acquired and functionally interrelated ego-attitudes. When the stability of these relations defined by ego-attitudes is disrupted, when the ties between the individual and other persons and groups defined by his ego-attitudes are impaired, when values implied in these ego-attitudes are threatened, or when activities of the individuals towards goals determined by his ego-attitudes are thwarted with subsequent experience of failure, the consequence is ego-tension, the degree and consequences of which will vary from case to case. We use ego-tension as a generic term to refer to painful, unpleasant experiences such as anxiety, insecurity, personal inadequacy, aloneness, shame, etc., none of which can be accounted for without bringing the ego-system into the picture. When ego-tension is caused by faliures or potential failures crushing or threatening our sense of adequacy, our sense of self-esteem, or by actual or potential blockage of the individual's ego-involved goals, the appropriate term for *ego-tension* in such cases may be *anxiety*. When the ego tension is the outcome of the disruption of the stability of our bearings or ties (ties of belongingness) in relation to our physical or social surroundings, when it is the consequence of blows suffered in the course of status strivings, the more appropriate term may be *insecurity*. When the ego-tension is due to physical or psychological isolation from individuals or groups we are identified with or aspire to be identified with, the appropriate term for this psychological state may be *aloneness*. When ego-tension is aroused by being caught in a situation in which our action or predicament is negatively at variance from the level of ego values, the resulting product may be referred to as *shame*. In cases in which the variance or deviation of experience and behavior is related to the few most central, fundamental ego values the resulting ego-tension may be appropriately termed the experience of *guilt*.

We should also mention ego-tensions due to *conflict*. These cases of ego-tensions are due to our being caught in a situation which demands contradictory roles in relation to that situation. These kind of ego-tensions, which are so frequently encountered in "casually patterned" societies with contradictory values existing side by side, have been treated extensively in the writings of sociologists, psychologists and novelists who are seriously concerned with the plight of modern man. One good illustration of the point is the case of the professional woman who cherishes the notion that her accomplishment is on a par with the top-notch males in her area but who cannot participate in a convention to share the honors with her male colleagues because of the demands of her husband (the demands of the husband reinforced by the prescriptions of social norms concerning the female role in society). Another example of the point is the case of the minority group member who constantly tries to be treated in harmony with the values embodied in the constitution of the country, but who is constantly frustrated because of these claims. Or, take the case of the minority group member whose identification is split between the country of which he is formally a member and another group physically far away, thus trying to have his cake and eat it at the same time.

We have to limit this discussion of ego-tensions to the lines of the particular problem of the present experimental study. The particular ego-tension in question is insecurity. It should be said, at this point, however, that there are cases of ego-tensions in which it is difficult to decide whether anxiety or insecurity would be a more appropriate label. For example, in the case of the present study the conditions are such that both the bearings of the person in relation to his surroundings and his sense of adequacy in the given task are involved.

Anxiety in its milder or neurotic form expresses a state of ego-tension which is the by-product of experienced threats or uncertainties, real or imagined (for present or future) which are felt as directed at our personal goals, personal values, hopes of success in relation to these goals and values which constitute the core of personality. Or when, under critical circumstances, the stability of our physical and social bearings are disrupted with the subsequent experience of not being anywhere definitely, of being torn from social ties of belongingness, or when nothing but a future of uncertainty or blockages is experienced as our lot, the by-product is the experience of insecurity. The individual tossing in such a state of anxiety or insecurity flounders all over in his craze to establish for himself some stable anchorages. The fluctuations of his experience and behavior are greatly increased. In

our opinion great fluctuations or variability in experience and behavior occur *first*, even in cases of persons who may *eventually* turn into themselves to build internally paranoid anchorages which are completely out of line with the facts of reality surrounding them.

The consequences of the ego-tensions, anxiety or insecurity are a state of restlessness, floundering all over to find some stable anchorages, heightened fluctuations of behavior. If these states of anxiety or insecurity are widespread among the individuals of a group, the result is an increased degree of suggestibility, the increased credulity for events that are bizarre and unexpected, a greater degree of susceptibility to the spread of wild rumors, the greater likelihood of panics. In the experimental findings presented previously, we gave evidence of the greater variability of reactions and greater suggestibility under conditions of uncertainty and failure. We gave various illustrations of some consequences of conditions of uncertainty and confusion.

In line with the illustrations already presented, the following passage from *The American Soldier: Combat and Its Aftermath* sums up clearly what we have tried to state regarding the effects of conditions of confusion, uncertainty which lack stable anchorages:

> In combat, the individual soldier was rarely sure of what had just happened, what was going on at the moment, or what was likely to occur next. He was subject to continual distraction by violent stimuli, and lived always under the tension of expecting the unexpected. This kind of unceasing confusion—the lack of firm constants to which behavior could be oriented—exposed the individual to insidious anxieties. All people need some stability in their environment; it has been repeatedly shown that *personality integration and the development of regularized patterns of behavior are strongly conditioned upon the existence of stable referents for activity. One of the prime functions of any sort of social organizations is to provide the individual with a dependable set of expectations.* Unless one knows, at least within broad limits, what behavior to expect from others, the very concept of adjustment becomes meaningless. So it is that the uncertainties and confusions of combat were themselves identifiable sources of stress. The frictions of battle, the mistiness of knowledge that goes under the name of "the fog of war," could be minimized by good provisions for transportation and communication, and by good discipline and administrative organization; but *uncertainty* always remained (35, p. 83-84, italics ours).

Problem

The problem is the experimental production of a state of anxiety or insecurity through elimination of stable anchorages in the situation. If this first part of our problem is demonstrated, then our next task will be to reduce

ego-tension (anxiety, insecurity) thus produced through the introduction of a few salient stable anchorages.

From a methodological point of view if we can exactly specify the course of elimination of stable anchorages and if the criterion of the appearance of anxiety or insecurity can be expressed in a clear-cut way in terms of the spread of judgments rather than in descriptive phrases, we shall be on a firmer ground in the study of the complicated matters of ego-tensions.

The statement of the problem as a production of a state of anxiety or insecurity through elimination of stable anchorages in the situation is too general a statement for an experimental study. It has to be specified to lead us concretely to the particular study and the appropriate procedures to be used. In psychological and especially psychiatric literature, the general case is neurotic anxiety or neurotic insecurity when these problems are dealt with. Besides these extreme cases, there are cases of anxiety or insecurity which are experienced for the duration of a temporary threat or potential threat to our ego values and goals, which are experienced for the duration of a temporary state of loss of our physical or social bearings under confusing and uncertain conditions. Ausubel, a keen student of ego problems, included a section on situational anxiety in his recent book on *Ego Development and the Personality Disorders* (3). He shows that when an individual faces a situation that constitutes a challenge to his sense of adequacy, the result is the experience of anxiety which may last for the duration of the situation at hand. In our experimental procedure, we aimed to produce a state of situational anxiety or insecurity through eliminating spatial anchorages as much as possible for the subjects in a task that requires spatial orientation. (This is especially true in the case of condition C, see pp. 288-291.) The psychological basis underlying this assumption is the following: One of the earliest phases of ego development in infancy is the delineation of bodily self from surrounding objects. Henceforth, the bodily self is a main anchorage in making spatial localizations as pointed out by W. Stern years ago. But this main anchorage (viz., the delineated bodily self) is not independent of the stability or instability of other anchorages in the surroundings. As the surrounding space relations become more unstructured or surrounding space anchorages are eliminated, the stability of the spatial bearings of the bodily self become increasingly difficult. So much so that some of the S's in our situation with least structure spatially lost their orientation. They reported walking towards West while they were actually moving South, or even a few reported moving West while they actually were moving East. The discovery on their part that their actual direction was at variance with

their experience of direction in such a seemingly simple task of finding their seats in complete darkness was conducive at least to a mild degree of situational anxiety.

The importance and implications of this general tendency for ambiguity and unstructuredness to lead to some degree of insecurity or anxiety for ego psychology has been emphasized previously:

> Even in cases of relatively simple events, ambiguity or unstructuredness delays the judgment time and renders judgmental activity rather tense and difficult. This is not a pleasant experience even on its simplest level. The ego is no exception to the general principle. Once it is formed with all its diverse ties in relation to goal objects, persons, and groups which stand in different degrees of affective relationship to it, the ego has to be anchored safely in many capacities. When these ties are disrupted, we experience insecurity and loss of personal identity. In fact, the feeling of personal security consists mainly of the stability of these ties which originally constitute the formation of the ego (31, p. 273).

The above line of psychological bases of our problem recently received a clear confirmation from a clinical psychologist. To this effect Abt states: "Clinical experience with a number of the projective methods has established my conviction that when any psychological task is ill defined, and when in addition the stimulus field is either quite ambiguous or new in the experience of the subject, the testee tends to react with anxiety, which may be either minimum or strong (1, p. 56-57). . . . I suspect, on the basis of certain experimental findings arising both from the laboratory and from social psychology, that as the stimulus field becomes progressively more and more unstructured—a process that forces the individual to rely increasingly upon internal or subjective factors in perception—there is a tendency for his anxiety level to increase markedly" (1, pp. 53-54).

Hypotheses

On the basis of the experimental findings presented, empirical observations reported, and the theoretical leads developed, it seems plausible to advance the following hypotheses to be tested:

The more unstructured and uncertain (with fewer definite anchorages) is the stimulus situation which the individual faces—

(a) The wider is his range or scale of judgments, thus revealing greater variability in judgments of the individual;

(b) the greater is the magnitude of the norm around which the individual scatters his judgments;

(c) the more accentuated are the differences between the judgments of individuals, this tendency being considerably reduced in group situations;
(d) the greater is the degree of convergence of judgments between individuals in group situations.

Subjects

Altogether, 85 subjects took part in the present experiment.[3] Each of the final experimental groups for the three experimental conditions consisted of 20 subjects (half male, half female). Each of these 60 subjects participated in two sessions, one individual and one group session under the appropriate condition.

The remaining 25 subjects were used in pre-testing the experimental conditions which were finally adopted in this study. Of this number, 9 were utilized in pre-tests of Conditions A and B, and 16 were pre-tested under Condition C.

All subjects were college students who were not familiar with the autokinetic phenomenon. Subjects were paired on the basis of a criterion of homogeneity. In all cases, males were paired with males, and females with females. Subjects were placed together who did not differ markedly in age, college classification, or ethnic background. To exclude the effects of prior relationships among the subjects, subjects paired in the group sessions were not acquainted with one another. Subjects were assigned to one of the three experimental conditions on a random basis.

Apparatus

The general disposition of the apparatus, which consists mainly of a small pin point of light exposed through a circular hole one millimeter in diameter, and a subject identification system, is essentially the same as that used by Sherif in earlier work. Two major improvements were made on the apparatus: The exposure time of three seconds (constant for all conditions) and signal to the experimenter (five seconds before the appearance of the

[3] These 85 subjects include only those used in the pre-test and experimental session of the main experiment reported here, the procedures of which were formulated for pre-testing after extensive preliminary work. This preliminary work, which was an exploratory attempt to find appropriate procedures, was carried out by D. Swander. The present report does not include any subjects or results from this preliminary work, which was presented as an experimental term paper in a graduate course at the University of Oklahoma, May, 1951.

autokinetic light) were altogether automatically controlled instead of being manually operated.[4] The source of the autokinetic light, was a small radio dial bulb burning at approximately normal brilliance on 6-8 volts.

The appearance of the autokinetic light, the exposure time and signal to the experimenter were controlled by relay circuits which were set in operation by the contact of electrically sensitized copper bosses mounted on Paklite disks with stationary spring loaded plungers. The three Paklite disks on which the bosses were mounted at appropriate locations to regulate automatically the timing of the autokinetic light, exposure time and signal to the experimenter, were driven by a Telechron synchronous motor at one revolution per minute.

Procedure

All subjects participated first in an experimental session *alone*, and then (after an interval of from 2 to 7 days) they were placed in a *group* session in pairs of two. The explanation given all subjects for being paired was that it should make the task easier as well as taking less time.

In both the individual and group sessions of the three conditions, each subject gave 50 judgments at a distance of 21 feet from the autokinetc light. If the subject, or subjects, failed to report movement of the light within 30 seconds after it appeared, the estimate was recorded as zero and the experimenter pressed a control key causing the light to disappear. There was a time interval of 1 minute between the disappearance of the light and its reappearance for a new judgment. The exposure time for all subjects was 3 seconds, i.e., there was a 3 second interval between the time the subject pressed his key indicating perceived movement and the disappearance of the light. All judgments, pertinent remarks and other behavior of the subjects were recorded by the experimenter.

After the second, or group, session, each subject filled out a questionnaire which contained items concerning his opinion on the positive or negative effect of another person's presence and estimates upon his own judgments, and his feeling of certainty accompanying the judgments. All subjects were then paid for both sessions at the rate of 65 cents an hour.

Conditions A, B, C: Since the purpose of the study was to examine the effects on judging an ambiguous stimulus of three degrees of experimentally induced uncertainty, the three conditions were made to represent gradations or degrees of difficulty in the form of fewer anchorages in the

[4] The apparatus was designed and constructed by Mr. Ralph Fearnow, formerly of the Physics shop of the University of Oklahoma.

situation. Physical anchorages were eliminated as described below. *The role of the experimenter was defined differently for the three conditions,* since preliminary exploratory work indicated that the experimenter, through friendly conversation and directions, was providing (social and spatial) anchorages in an uncontrolled way.

The three conditions ranged from A, the relatively easy and simple, through B, of intermediate difficulty, to C, the most uncertain and difficult.

Condition A

This condition was intended to produce the least uncertainty among the subjects. To effect this, the experimental situation was made relatively simple and the role assumed by the experimenter was one of informality and friendliness. The experimental room for this condition (15 by 28 feet) was much smaller than for the other conditions (81 by 54 feet). Subjects had a brief glimpse of the interior, the seat, table and of the space relations in the room. Thus the subject in Condition A had some opportunity to orient himself in relation to definite anchorages, such as walls, chair, table, etc.

Individual Session: The attempt was made to establish rapport by spending several minutes with each subject in informal and friendly conversation before the experimental session. The subject was assured the task was simple and easy, that there was no doubt that he would do well. In short, *in Condition A the experimenter was as friendly and encouraging as possible.* After ascertaining if the subject "was about ready to try your luck at judging distance," he was instructed: "Now I will take you to a dark room where I will show you your chair. Your only task will be to judge how far a point of light moves."

The subject was then taken to the experimental room. As he entered he was, by a brief flash of light, shown his seat and table on which there was a switchbox connected to the autokinetic apparatus. He could dimly see the walls of the room. As soon as he reached his chair, the door was closed, leaving the room in total darkness. The curtain, which prevented the subject's seeing the end of the room containing the apparatus, was then withdrawn and the experimenter went to the apparatus in a confident manner.

Approximately 5 minutes elapsed before the subject began his judgments in order that the degree of dark adaptation would approximate that of subjects in the other conditions (especially Condition C) in which a longer period was required for the subject to find his seat. During these few minutes, the experimenter continued to carry on informal and friendly conversation with the subject.

Then the subject was instructed:

> You will be shown repeatedly a point of light like this. (The light was shown.) It shall always appear in this same place. Several seconds before the light is to appear I shall say "Ready," then the light will appear. After a short while, the light will begin to move. As soon as you see it move, press the button. Remember, do *not* press the button when you first see the light, but press it as soon as you see the light begin to move. After you have pressed the button, release it. Presently the light will disappear. After the light has disappeared, tell me the total distance the point of light moved, trying to make your estimates as accurate as possible.
>
> We are not interested in the direction of the movement, but only in your estimate of the total distance the point of light moved.
>
> Is there anything that is not clear?

Subjects were instructed to give only the total distance and not the direction so that in the group session they would not be reporting movement in different directions, which would have aroused strong suspicions among them.

After 2 practice trials, each subject gave 50 judgments. Throughout the experimental session, the experimenter remained friendly and responsive to the subject.

Group Session: The procedure here differed from the individual session only to the extent necessary for adaptation to a group situation. The experimenter tried to perpetuate any rapport established in the first session, as well as attempting to contribute to a positive interaction between the subjects. After several minutes of conversation among the subjects and experimenter, the subjects were taken to the experimental room. The only difference in the instructions was that the subjects were instructed that after they had pressed their keys and the light had disappeared, they were to:

> Give your estimates of the distance the light moved, one of you at a time. As you give your estimate, press the key in front of you again and release it immediately. (This permitted the subject to be identified by signal on the apparatus before the experimenter.) It does not matter which of you gives your estimate first; but in order that you will not be influenced by the other person's estimate, let the same person not give his (her) estimate first every time.

Condition B

This condition was between A and C in difficulty. ***The greatest difference between Conditions A and B was in the size of the experimental room.*** This room, 81 by 54 feet, was formerly a theater on a Navy base. It was located

in a larger, vacated building in which there was no activity except the experimentation. On the way to the experimental room, it was necessary to traverse a dimly lighted corridor. *The experimenter sought to establish rapport wth the subject in the same way as described for Condition A,* but this was undoubtedly made more difficult because of the less pleasant setting in the abandoned recreation hall.

Individual session: Before going to the experimental room, the subject was instructed: "I will take you into a dark room where I will lead you to your chair. Your only task will be to judge how far a point of light moves."

Unlike Condition A, the subject never saw the space relations inside the experimental hall. The experimenter entered the darkened room ahead of the subject, and taking his hand, led him to his chair, which was 10 feet from the door. To reassure the subject, the experimenter acted very confidently in the dark, especially in leading him to his chair. After about 5 minutes of dark adaptation, the same procedure was followed as for the individual session in Condition A.

Under Condition B, the subject had little idea of his relationship to the room. The fact that the room was so large produced such acoustical conditions that the subjects had a difficult time estimating their distance from the experimenter (an important index employed by many in their attempts to find some means to aid them in the accuracy of their judgments).

Group Session: The procedure for this situation was practically identical to that described for Condition A, group session, the exception being that the subjects held hands and were led to their seats by the experimenter. The instructions were the same as for the group session, Condition A.

Condition C

This was intended to be the situation in which spatial anchorages were eliminated as much as possible, hence the most difficult. *The experimenter made no attempt to establish rapport with the subjects, being matter of fact instead of warm and cordial, and engaging in only the necessary minimum of conversation throughout the sessions. More significant than the changed air of the experimenter was the increased difficulty in the experimental conditions.* The experimental room was the same one used for Condition B, but several factors were introduced which made it much more difficult (See Figure 1).

At a distance of 12 feet from the entrance, stairs were placed containing 4 steps in the front and 3 steps down in the back. The area of the room was marked off with ropes so that the only way the subject could reach his chair was by passing over the stairs (unless he crawled through the ropes,

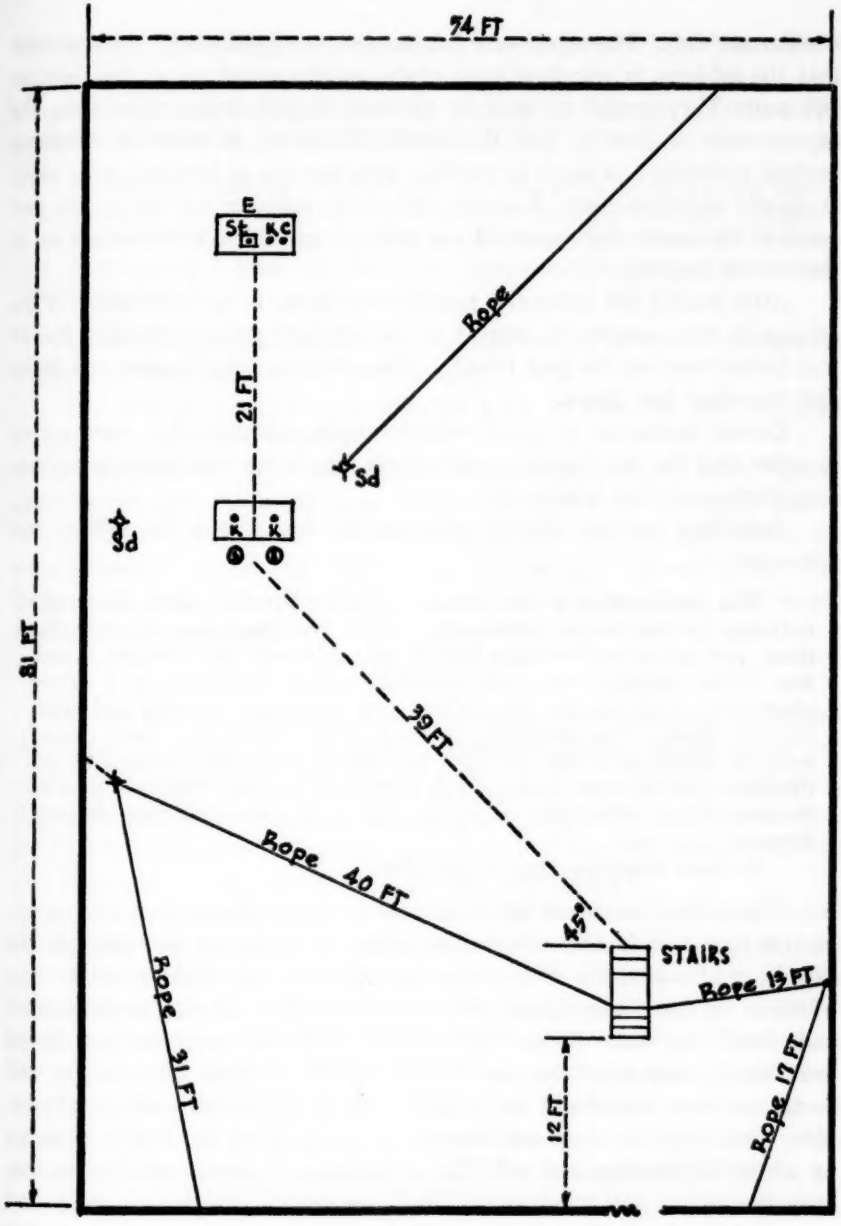

FIGURE I - Disposition Of The Experimental Setup for Condition C

which none did). The ropes were introduced after preliminary work showed that the subjects in search of their chairs usually ended up at the right or left wall. They tended to stick by the wall despite instructions from the experimenter on how to find their goal. Therefore, in order to eliminate vertical anchorages as much as possible, rope barriers at hip level were used. It should be pointed out, however, that when subjects lost their way and came to the ropes, the ropes did not provide any definite anchorage as to their exact location.

After finding the stairs and passing over them, it was necessary for the subject to turn exactly 45 degrees to his left and proceed straight for 39 feet before reaching his goal (chair). There was nothing between the stairs and the chair but space.

Certain landmarks in simple relation to the subject's chair were set up in order that the experimenter could direct him to his seat when he became completely lost (See Figure 1).

Individual session: Before going to the dark room the subject was instructed:

> You are to enter a dark room. (The subject had been shown the entrance he was to use previously.) After you have gone through the door, you are to pull it tight behind you and pull the curtains closed, too. (The curtains were used to insure against light leakage.) Then place your back to the door which you have just entered and walk straight ahead. You will come to some stairs. When you have passed over the stairs, stop and turn left 45 degrees, and walk straight in the direction you are then facing. You will come to your chair and a table in front of it. After you find your chair, sit down and face directly forward.
>
> Is there anything that is not clear?

The subject was then left in an office, several doors from the experimental room, while the experimenter made his way to his chair in the experimental room. He then called the subject, who could not tell from where in the experimental room the sound had come. As soon as the subject had closed the door of the experimental room, the experimenter started recording by stop clock the time it took for him to reach his chair, as well as all pertinent remarks of the subject. The experimenter maintained complete silence despite frequent attempts of the subjects to establish contact by asking for direction and aid. The experimenter's silence was broken only after the subject had wandered for 3 minutes without finding his chair, had expressed the fact twice that he was lost and had given up, or had reached his chair. When the subject became lost the experimenter directed him to

his chair by explaining the relationship of certain landmarks to the subject's table.

After the subject had reached his chair, either through his own ability or by directional aid, he was instructed:

> There is a table in front of you. On this table there is a box with a button on it. You will be shown a point of light like this. (Light was shown.) It shall always appear in this place. Several seconds before it is to appear I shall tap like this. (Experimenter tapped the table with a pencil.)

The tapping was substituted for saying "ready" to reduce further the contact between experimenter and subject.

The rest of the procedure was the same as that for the individual sessions in Conditions A and B.

Group session: Here the subjects sought their seats in pairs. Before entering the dark room, the same instructions as for the individual session of Condition C were given. After the subjects had reached their chairs, the same procedure as for the other group sessions was followed except that instead of saying "ready" before the appearance of the light, the experimenter tapped his pencil.

Results

In line with the statement of the problem and the hypotheses advanced, the treatment of the data is made in terms of comparison of ranges and norms of judgment under Conditions A, B, and C in individual and group situations. Attention should be called to the fact that the crucial comparisons are between data obtained under Condition A (relatively easy condition) and Condition C (the condition of greatest uncertainty).

The formulation of our problem and hypotheses derived from experimental and empirical findings indicated that the more uncertain, the more chaotic the situation the individual faces, the greater the likelihood of individuals floundering around. In view of this, the gross measure of statistical range acquires special importance. Figure 2 shows striking differences in the scope within which individuals distribute their judgments under Conditions A, B, and C. Under Condition C, in which all anchorages were eliminated as much as possible, this scope becomes startlingly large when compared with that of the more usual autokinetic situation (Condition A), which though vague and indefinite affords a few anchorages for the individual.

Method of Analysis. Since the frequency distributions under our various conditions are not normally distributed, it was decided that non-

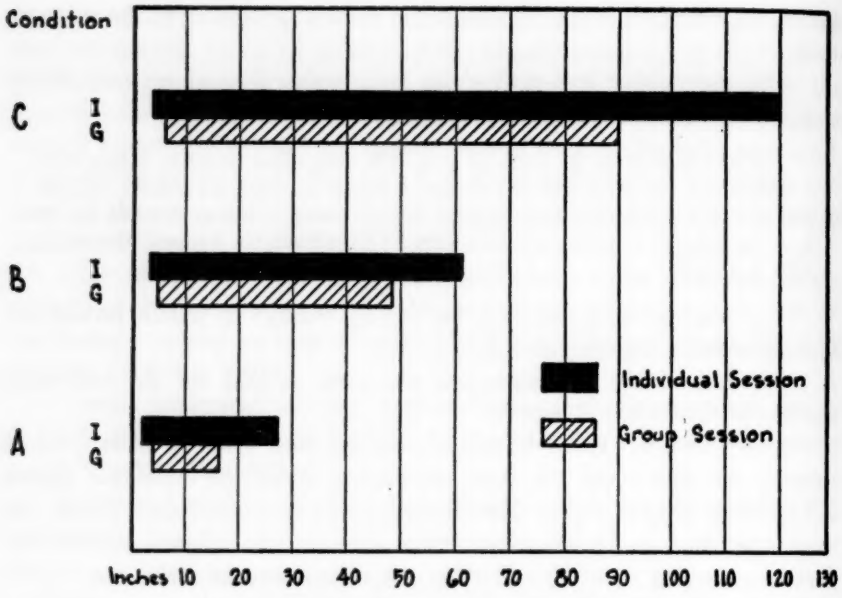

FIGURE II - Spread of Individual Judgement Ranges Under Conditions A, B, & C In Individual and Group Situations

parametric tests (i.e., tests which do not depend upon the form of the frequency distribution) be used wherever feasible. It was found that this could be done in comparing the judgment ranges and medians of individuals under the various conditions. The non-parametric test used is the so-called sign test (13). Our use of this test is in modified form. The test as used by us, with the modifications explained, is as follows:

Suppose a random variable has a certain probability distribution, and two samples A and B of the same size N are taken at random and are both ordered according to size from the smallest to the largest:

$$A: \quad X_1 \leqslant X_2 \leqslant \ldots \leqslant X_N$$
$$B: \quad Y_1 \leqslant Y_2 \leqslant \ldots \leqslant Y_N$$

Consider the set of differences:

$$D: \quad X_1\text{-}Y_1,\ X_2\text{-}Y_2,\ \ldots,\ X_N\text{-}Y_N$$

The expected values of the number of positive entries and the number of negative entries in D are the same. The sign test given in Dixon and

Massey, Table 10, may accordingly be used. Our modification, a minor one, is in noting that an arbitrary prescribed method of pairing the observations from the two samples may be used, without impairing the validity of the sign test. The method of pairing used here is obtained by ordering the sample values from the smallest to the largest.

Regarding the comparison of variation of judgment ranges and medians between individuals under the various conditions, the standard F test was used. This was done with reluctance, since, there seems to be no non-parametric test available at the present time for comparing measures of spread. In crucial comparisons, from the point of view of hypotheses, the F ratios are so large that, at least in these cases, the deviation from normality is not likely to affect the conclusions.

Comparison of judgment ranges for individuals under Conditions A, B, C. Table 1 gives ranges in judgments for 20 individuals in alone situation and

TABLE 1

JUDGMENT RANGES UNDER VARIOUS CONDITIONS IN INDIVIDUAL AND GROUP SITUATIONS

	CONDITION A		CONDITION B		CONDITION C	
	Ind.	*Group*	*Ind.*	*Group*	*Ind.*	*Group*
1.	2	4	3.5	4.5	3.5	6
2.	2.75	5	4.5	4.5	14	8
3.	4	5	5	6	14.5	8
4.	4.5	5	6	6.5	21	11
5.	5	5	6	7	21	12
6.	5	6	7	8	21	14
7.	5.5	6	8.5	9	23	22
8.	7.5	7	14	11	23	22
9.	8.5	8	15	12	24	22
10.	9	8	18	12	29	22
11.	10	8	22	18	31	23.5
12.	11	8	24	24	37	24
13.	12	8	35	24	44	24
14.	12	8	45	24	54	24
15.	13	10	47	25	58	30
16.	14	10	48	35	60	32
17.	15	12	58	42	70	32
18.	17	12	58	42	71	35
19.	17	16	60	48	120	60
20.	27	16	61	48	120	90

The ranges in individual situations (Session I) and group situations (Session II) under Conditions A, B, C. The ranges under alone and group sessions are arranged in ascending order and the rows do not represent the ranges obtained from the same subject in individual and group sessions. Range in inches.

TABLE 1a

SIGN TEST COMPARING JUDGMENT RANGES OF INDIVIDUALS UNDER CONDITIONS A, B, AND C IN INDIVIDUAL AND GROUP SITUATIONS

	Between	*Number Positive***	*Number Negative*	*r**	
BETWEEN CONDITIONS	A_I and B_I	20	0	0	$P < .01$
	A_I and C_I	19	0	0	$P < .01$
	B_I and C_I	19	1	1	$P < .01$
	A_G and B_G	19	1	1	$P < .01$
	A_G and C_G	20	0	0	$P < .01$
	B_G and C_G	14	3	3	$P < .05$
BETWEEN INDIVIDUAL AND GROUP SESSIONS	A_I and A_G	13	6	6	$P = .17$
	B_I and B_G	12	6	6	$P = .20$
	C_I and C_G	19	1	1	$P < .01$

* $r = 3$ is .01 probability level for $N = 20$, (Table 10, *13*).

** The number positive is the number of pairs in Table 1 for which the difference between the range for the individual under the second listed condition and that for the individual under the first listed condition is positive; e.g., the number of pairs for which the score under B_I exceeds that under A_I in Table 1 is the score under number positive for "A_I and B_I" in Table 1a.

group situation under each of Conditions A, B, and C. These will be labeled A_I, A_G, B_I, B_G, C_I, and C_G. The test outlined above is applied to comparisons between A_I and B_I, A_I and C_I, B_I and C_I, A_G and B_G, A_G and C_G, and B_G and C_G, and also between A_I and A_G, B_I and B_G and C_I and C_G. The results are shown in Table 1a.

From the results presented in Tables 1 and 1a, it may be inferred that:

1. The greater the uncertainty and stress, the more individuals fluctuate in their judgments.

2. The results for the comparison of C_I and C_G indicate that the fluctuation of judgment is significantly reduced in the situation of greatest stress, Condition C, by group interaction, while this is not true in the comparison of group and individual sessions under Conditions A and B.

Comparison of variation of judgment ranges between individuals under Conditions A, B, C. It is also of interest, regarding Table 1, to see whether

TABLE 1b

COMPARISON OF VARIATION OF JUDGMENT RANGES BETWEEN INDIVIDUALS UNDER CONDITIONS A, B AND C IN INDIVIDUAL AND GROUP SITUATIONS

(For 19 x 19 degrees of freedom .05 and .01 probability levels of F are 2.2 and 3.0 respectively (34))

	Between	*F Value*	
BETWEEN CONDITIONS	A_I and B_I	12.6	$P < .005$
	A_I and C_I	28.4	$P < .005$
	B_I and C_I	2.3	$P < .05$
	A_G and B_G	18.7	$P < .005$
	A_G and C_G	30.9	$P < .005$
	B_G and C_G	1.7	$P > .05$
BETWEEN INDIVIDUAL AND GROUP SESSIONS	A_I and A_G	3.1	$P < .01$
	B_I and B_G	2.1	$P > .05$
	C_I and C_G	2.8	$P < .03$

there is more variation between individuals in situation C than, say, in situation A. Table 1b gives the results of F tests applied to the data of Table 1.

The results of Table 1b permit the following inferences:

1. These results indicate considerably more variation of judgment ranges between individuals under Condition B than under Condition A and even more strikingly greater variation under Condition C than under Condition A in both alone and group situations.

2. They also indicate more variation of judgment ranges under Condition C than under Condition B; and more variation in alone situation than in group situation, under each of Conditions A, B, and C, but not nearly in the same degree as, say, between Condition A and Condition B.

Comparison of medians of judgments under Conditions A, B, C in alone and group situations. The medians of judgments of individuals under Conditions A, B, and C in alone and group situations are presented in Table 2.

The results of the sign test comparing medians of judgments of individuals under Conditions A, B, and C in alone and group situations are presented in Table 2a.

TABLE 2

MEDIANS OF JUDGMENTS UNDER CONDITIONS A, B, C, IN INDIVIDUAL AND GROUP SITUATIONS

	CONDITION A		CONDITION B		CONDITION C	
	Ind.	*Group*	*Ind.*	*Group*	*Ind.*	*Group*
1.	1.20	1.90	1.70	2.31	2.87	3.73
2.	1.56	2.29	2.78	2.58	5.78	4.40
3.	2.23	2.45	2.81	2.91	6.80	5.00
4.	2.50	2.52	2.91	4.31	7.75	5.00
5.	3.00	2.89	4.11	4.42	8.33	5.33
6.	3.17	3.50	4.15	4.85	8.35	5.48
7.	3.24	3.86	4.80	5.33	9.50	6.25
8.	3.50	4.31	6.00	5.53	10.50	7.00
9.	4.66	4.56	6.44	5.90	12.69	7.12
10.	4.69	5.00	8.40	6.56	12.73	8.27
11.	5.00	5.08	9.67	7.92	12.75	8.86
12.	5.50	5.12	9.82	7.92	17.29	8.92
13.	5.91	5.17	11.61	9.82	17.61	10.36
14.	7.60	5.50	11.67	10.00	20.75	11.64
15.	8.36	6.12	14.00	10.80	22.00	11.67
16.	8.43	6.26	16.75	11.00	27.45	12.50
17.	10.91	6.56	17.80	15.75	36.65	12.61
18.	11.00	10.86	33.18	18.67	48.00	12.92
19.	16.28	11.00	33.94	18.78	52.00	24.00
20.	17.34	12.18	43.00	20.67	72.00	25.39
Median of Group	4.85	5.04	9.04	7.24	12.74	8.56

The medians in individual situations (Session I) and group situations (Session II) under Conditions A, B, and C. The ranges under alone and group sessions are arranged in ascending order and the rows do *not* represent the ranges obtained from the same subject in individual and group sessions.

Confidence limits of the median for Condition A (individual) at 95% confidence, as computed by the median limits test (Dixon and Massey (*13*), p. 254; Table 25, p. 360) lie between 3.17-8.36, and for Condition C (individual) between 8.35-22.00. This indicates almost no overlapping in the confidence limits of the medians for the individual sessions of Conditions A and C. Confidence limits of other medians are intermediary between these extremes with various degrees of overlapping in the expected directions.

Median in inches.

TABLE 2a

SIGN TEST COMPARING JUDGMENT MEDIANS OF INDIVIDUALS UNDER CONDITIONS A, B, AND C IN INDIVIDUAL AND GROUP SITUATIONS

	Between	*Number Positive*	*Number Negative*	*r*	
BETWEEN CONDITIONS	A_I and B_I	20	0	0	$P < .01$
	A_I and C_I	20	0	0	$P < .01$
	B_I and C_I	20	0	0	$P < .01$
	A_G and B_G	20	0	0	$P < .01$
	A_G and C_G	20	0	0	$P < .01$
	B_G and C_G	18	2	2	$P < .01$
BETWEEN INDIVIDUAL AND GROUP SESSIONS	A_I and A_G	11	9	9	$P > .25$
	B_I and B_G	14	6	6	$P > .10$
	C_I and C_G	19	1	1	$P < .01$

From the results presented in Table 2a, the following inferences can be drawn:

1. The results indicate that individuals have significantly higher medians under condition of maximum uncertainty (Condition C) as compared with conditions of less uncertainty (Conditions A and B). The greater the uncertainty and stress the greater the median value of judgments.

2. Under the condition of greatest stress (Condition C) the medians of judgments are significantly reduced by group interaction; while this reduction is not nearly as high under Conditions A or B.

The results of F tests comparing fluctuation of judgment medians between individuals under our various Conditions A, B, and C in individual and group situations are presented in Table 2b.

The following inferences can be drawn from the results in Table 2b:

1. The results indicate greater variation of medians of judgments between individuals under Condition B than under Condition A, and more variation under Condition C than under Condition A to an even greater degree, in both alone and group situations. Thus, the greater the degree of uncertainty and stress the greater the fluctuation of judgments between individuals.

2. They also indicate significantly more variation between the medians

TABLE 2b

COMPARISON OF VARIATION OF JUDGMENT MEDIANS BETWEEN INDIVIDUALS UNDER CONDITIONS A, B, AND C IN INDIVIDUAL AND GROUP SITUATIONS

	Between	*F Values*	
BETWEEN CONDITIONS	A_I and B_I	5.5	$P < .005$
	A_I and C_I	14.6	$P < .005$
	B_I and C_I	2.7	$P < .05$
	A_G and B_G	3.3	$P < .01$
	A_G and C_G	3.4	$P < .01$
	B_G and C_G	1.0	$P > .05$
BETWEEN INDIVIDUAL AND GROUP SESSIONS	A_I and A_G	2.1	$P > .05$
	B_I and B_G	3.3	$P < .01$
	C_I and C_G	8.6	$P < .005$

of judgments of individuals in alone situation than in group situation under Condition C. The same effect is observed under Conditions A and B but not to the same degree as under Condition C.

During the group sessions, the judgments of the subject pairs converged toward one another in varying degrees under each of the three experimental conditions (A, B, C). The medians of blocks of 10 judgments were plotted serially for each subject in individual and group sessions. These curves revealed convergence throughout the course of the group sessions. It should be noted, however, that convergence did not always result in a lowering of the individual's norm (median) as would be expected if a general "leveling effect" were operant as the chief factor. The individual medians were raised or lowered in the group interaction depending upon the relation between subjects established in the group session.

As the results in Tables 1a, 2a, and 2b indicate, variability and medians of judgment of individuals were reduced in the group situation under all experimental conditions, the differences between individual and group situations being most significant for Condition C. (However, this tendency is not clear in Table 1b.) Since the direction of these shifts was toward the partner's norm, these results indicate convergence of judgment in the group situation, especially under Condition C.

Further suggestive indication of this greater convergence under conditions of greatest uncertainty is revealed in the percent shift in medians from the individual to the group session $\frac{(Mdn._I - Mdn._G)}{Mdn._I}$. (This method of computation is open to obvious and serious criticism, since it assumes that the proportion has some psychological validity regardless of the absolute values of differences and initial medians.)

The mean of these percent shifts for Condition A was 41.8% and that of Condition C was 53.4%. In Condition A, 12 subjects had less than 35% shift; in Condition C, 5 subjects had less than 35% shift. For the reasons mentioned above, these findings are considered merely suggestive. Another interesting trend in the results of Condition C was for the greatest percent shift in medians to be found among the subjects with the largest initial median and Q (individual session) of the pair. With one exception, this was the case for every pair under Condition C.

Observations of the experiment and the reactions of subjects on the questionnaire indicated certain complications in the group situation under Condition C which are relevant to any conclusions drawn from the above results and which will be discussed below.

Other data of particular significance: In the study of a complex problem such as ours (viz. ego problems), it is not sufficient to present only statistical analysis of results, no matter how impressive our confidence levels. We have to look for supporting evidence as well. In our opinion, some of the behavior of the subjects and their own perceptions as to what happened during the course of the experiment are at least equally revealing. Responses to the questionnaire items, spontaneous remarks of the subjects and their behavior confirm and sharpen the statistical analysis revealing significant differences, especially between Conditions A and C.

One questionnaire item concerned the subject's difficulty in making judgments. Under Condition A (relatively easy), 14 or 70% of the subjects indicated that "estimates were easy" or "no major difficulty in any estimates." In contrast, 90% of subjects in Condition C (with fewest anchorages) reported difficulty in half, the majority, or most of their estimates, only 2 subjects indicating that their "estimates were easy."

Content analysis of answers to an open general question asking for the subject's reactions to the individual session revealed increasing uncertainty and confusion from Condition A to Condition C. In Condition A, 5 (25%) subjects indicated uncertainty as contrasted to 9 (45%) in Condition B and 13 (65%) in Condition C. Typical comments of subjects in each

condition reveal qualitative differences even in this experienced uncertainty, among those who spontaneously included it in their responses:

Condition A: "I felt ill at ease, but curious."

Condition B: "Bewildered. I don't ever remember even being in such complete darkness. And it was a little nerve wracking."
"Very unsure and a little afraid, not of anything in particular, just of a strange and totally unexplained situation."

Condition C: "Felt helpless and ill at ease—was very puzzled."
"Completely confused. Lost as heck."

Further spontaneous remarks of the subjects substantiated this supposition that uncertainty and instability were not only experienced more frequently under Condition B and especially C, but that such uncertainty was more intense in the latter conditions. For example, one subject in Condition B remarked: "The first time when I was there by myself, it sometimes seemed as if the room was moving with me. Sometimes it seemed like my chair was turning over to one side. When I would move my feet away from a spot and replace them, it seemed like the floor was laying at an angle."

In Condition C, the most difficult and uncertain condition, there were frequent attempts by the subjects to anchor themselves to some physical point in the vast space of seeming emptiness. It was the usual practice, when finding a line, to hold on to it and follow it back and forth several times. Some found an object and then would radiate out from this, going a counted number of steps in one direction, retracing these steps to the object and going a certain number of steps in another direction or an increased number of steps in the same direction. There seemed to be a tendency to hang on to an object once discovered. One female subject typifies the more extreme behavior of those who reluctantly gave up their physical anchorages to continue in their search for the chair. This girl, after having difficulty in finding and crossing the steps, wandered back and forth several times following a line and then exclaimed: *"I can't tell which way is forward."* Finally she bumped back into the stairs and just gave up. After she stood still and completely quit for three minutes, the experimenter, with much difficulty, directed her to her seat.

Subjects under Condition C in the alone situation often asked the experimenter for directions and aid to their goal. In this condition, as well as in Condition B, subjects frequently asked their distance from the experimenter in an effort to have some yardstick for judging their location and that of the light.

In the *group situation*, subjects often remembered from the first (individual) session some physical anchorage in the room and its relation to the chair. Such subjects tried to make their way to these remembered points and to get their bearings from there, with varying degrees of success. As a result of this and the presence of another person, about half of the subjects in Conditions A and B stated in response to an open question that they felt more at ease in the group situation than the individual. Seven subjects in Condition C volunteered that they felt more at ease in the group situation. There is some evidence that some subjects in the group situation under Condition C felt new uneasiness and some resentment. While 65% of subjects in Condition A preferred to make their judgments in the group situation, only 35% of those in Condition C preferred the group situation. Another 35% in Condition C preferred to judge alone as compared with 20% preferring the individual session under Condition A. (The remaining subjects were "indifferent." The above percentages for Condition B are 45% and 30% respectively.)

Similarly 45% of subjects in Condition C felt that their partner's estimates were a hindrance in making their own estimates, as compared to 10% in Condition A and 30% in Condition B. One subject in Condition C, for example, remarked: "I'm afraid I wasn't accurate on that (group session). I didn't feel as alone but I wondered if she (her partner) were criticizing my estimates." Another wrote that he preferred to be alone because "presence of another hinders me in being sure of estimates."

Such representative data indicate rather clearly that some subjects in Condition C were made to feel insecure when their rather unstable norms from the individual session were assailed or disagreed with by another person. Because of wide individual differences between medians and ranges in the individual sessions of Condition C and the relatively small number of subjects, subjects of several pairs initially had widely differing norms when they entered the group situation. As indicated on p. 298, subjects under Condition C actually tended to converge toward the judgments of their partners to a relatively greater degree than did those in Condition A. However, the above data indicate that some subjects in this condition of greatest uncertainty (C) gave ground begrudgingly, but did so nevertheless because of the greater insecurity of their grounds.

While there is no doubt that in some conditions of extreme uncertainty, actual clashes may occur traceable to widely differing standards of individuals, we do not believe this would be the case if the relationship between the individuals were one of mutual dependence, rather than one of annoyance or

resentment. The present experimental set-up was not sufficiently conducive to the establishment of mutual dependence between subject pairs. For this reason, our hypothesis (e) predicting greater convergence in the group situation under conditions of greater insecurity and uncertainty has probably not been adequately tested in spite of favorable statistical results (only the results of Table 1b are not clear in indicating this tendency). As a first step in doing so, we would want, in a condition of great uncertainty, to establish a relationship of mutual dependence between subjects prior to their judgments. In short, this hypothesis should hold true when individuals in a condition of great uncertainty find another person or group as their main anchorage in the situation. In lieu of establishing such a relationship, a person of considerable prestige as partner would be an interesting possibility. A negative test of this general hypothesis would be to create between two individuals a relationship of mutual distrust and suspicion or resentment prior to the judgment.

Summary and Conclusions

This study is presented as an experimental contribution to an aspect of the psychology of ego functioning. Specifically, it attempts to investigate the effects of situational uncertainty on ego functioning. The basic assumption is that the ego of the individual, which implies his characteristic relatedness to his surroundings as reflected in his characteristic reactions, is built up in relation to physical and social anchorages from childhood on. The stability of his ego, hence the consistency of his reactions, is dependent upon the stability of these physical and social anchorages. As the physical and social anchorages become more unstable, more uncertain, the individual's personal bearings become more unstable, more uncertain. This condition of instability, of uncertainty is thus at the basis of the experience of insecurity. Psychological states of anxiety or insecurity always involve ego reference. Insecurity is that state of ego tension produced by actual or perceived shattering of physical or social anchorages, or actual or perceived uncertainty of one's physical or social grounds in the present or in the future.

The psychological consequences of the actual or experienced loss of physical and social bearings are at least *initially* increased fluctuations, variations in reactions, floundering around in search of something to hold on to, strivings to re-establish some level of stability through available anchorages.

The specific problem of the study was to produce situational insecurity by elimination of spatial anchorages, thus affecting the stability of some of the developmentally earliest ego relationships, *viz.*, spatial anchoring of the

self. Variability of behavior was tapped through simple judgmental reactions, with the assumption that even the most complicated motivational states are reflected in such reactions.

In line with the leads derived from our previous work, the autokinetic situation was utilized. On the basis of preliminary trials, three conditions representing three degrees of uncertainty were chosen. In the main experiment, 60 subjects took part. All were normal university students who were not previously acquainted with the autokinetic situation or with one another. Under all conditions, each subject took part in an individual session, and later a group session. There were 10 subject groups under each experimental condition.

In line with our hypotheses, it was found that:

(a) The more uncertain the situation, the greater the scale within which judgmental reactions are scattered.

(b) The more uncertain the situation, the greater the magnitude of the norm or standard around which judgments are distributed.

(c) The more uncertain the situation, the larger the differences between the scales and norms of judgment of different individuals.

(d) The more uncertain the situation, the greater the tendency, on the whole, toward convergence in group situations.

The tendency under (d) is stated with qualifications due to the nature of specific procedures in the present study and the perceived relationship between the subjects.

This approach to the complicated ego problems, which are considered more and more as central in understanding human personality under various conditions of life, has the advantage of tying together (a) findings and theoretical formulations concerning ego formation and functioning, (b) empirical observations concerning the effects of actual conditions of uncertainty and stress on human experience and behavior, and (c) the study of motivational and attitudinal factors through the paradigm of relatively simple judgmental and perceptual reactions developed during the past two decades.

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EXPÉRIMENTATIONS SOCIOMÉTRIQUES APPLIQUÉES AU GROUPE FRATERNEL

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A notre connaissance, l'expérience sociométrique n'a jamais été appliquée au groupe fraternel. On a même signalé[1] que, pour des raisons d'ordre technique, l'exploration sociométrique pénétrait difficilement certains groupements, la famille notamment. Nous avons néanmoins soumis au test sociométrique des groupes de frères et soeurs dont nous avions pour certains une connaissance clinique approfondie, les ayant observés régulièrement durant plusieurs années.

Appliqué à des groupes restreints et clos, le test de Moreno a dû subir quelques modifications que nous allons préciser.

1.—*L'expansivité émotionnelle* des sujets n'a pu être prise en considération car dans des groupes comprenant en moyenne 5 à 6 membres, il ne saurait être question de limiter le nombre des choix.

2.—Par contre, *l'ordre préférentiel* des choix prend une importance primordiale. Le dernier choix de la hiérarchie est par convention assimilé à un rejet.

3.—Les *choix réciproques* n'ont été considérés comme tels que lorsqu'ils comportaient le même numéro d'ordre dans les deux sens. (Par exemple: le 4e choisi donne le même rang au partenaire qui a émis ce choix.)

4.—Pour comparer entre eux les enfants d'un groupe donné du point de vue de leur attraction sociale, on a déterminé un *Indice de Polarisation* soit I.P. égal au rapport: $\frac{\textit{somme des choix hiérarchiques}}{n-1}$; n, étant le nombre d'enfants du groupe fraternel. L'indice de polarisation du *favori* est égal à, ou voisin de: 1; celui de *rejeté* tend vers: n—1. Par exemple, dans un groupe de 7 enfants, (n—1=6) un enfant choisi 1er par tous les autres, a un indice de polarisation égal à: $\frac{6}{n-1} = 1$

L'interprêtation des sociogrammes de ces groupes fraternels fait surgir le problême de l'objectivité des choix et corrélativement celui des rapports

[1] Zazzo, Patin et Koskas.—lères recherches de sociométrie dans une maison d'enfants. in: Enfance 5, 1949.

de la méthode sociométrique avec la méthode clinique. Selon Maucorps[2] le test sociométrique n'est pas influencé par les relations extérieures à l'enquête; il permet une révision objective des jugements de valeur portés sur autrui. Cependant nous avons constaté de façon nette un retentissement de l'appréciation parentale sur les choix fraternels. Dans le groupe familial, (et probablement dans d'autres groupes clos) le prestige dont jouit un enfant, ou la réprobation dont il est l'objet se répercutent sur les choix exprimés par les autres. Les déclarations spontanées des enfants en témoignent.

Ainsi Odile, 8 ans ½ justifie sans y être invitée sa préférence pour Dominique, son frère aîné: "Je mets Dominique avant François (un frère cadet), parce que François fait encore des colères alors que Dominique n'en fait plus." (cf. Fig. 1.)

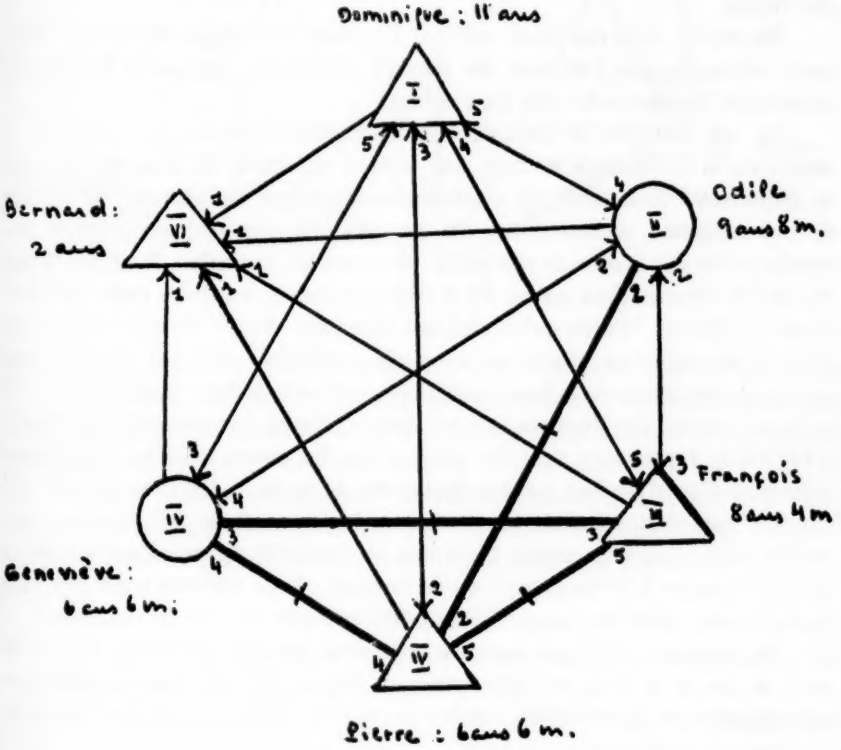

FIGURE 1

[2] Maucorps P. H. Enquête psycho-sociologique sur la cohésion fonctionnelle dans les groupes restreints. in: Cahiers Inter. de Sociol. 1949.

Par ailleurs le premier rang échoit presque toujours unanimement au dernier-né surtout si celui-ci se trouve être un nourrisson. Dans plusieurs groupes fraternels de 4, 5, 6 enfants le dernier-né obtient l'I.P. maximum de 1. Cherchant à expliquer cette préférence, nous avons questionné un certain nombre d'enfants; presque tous ont répondu: "Je l'aime bien parce qu'il est si mignon," reflétant de la sorte l'opinion des parents qui parfois exédés par les espièglerie de l'un ou l'autre de leurs enfants, citent par opposition le bébé en exemple. Des considérations analogues expliquent que les "rejetés" d'un groupe fraternel se recrutent souvent parmi les enfants les plus désobéissants de la famille ou parmi les aîné(e)s. De même dans une vingtaine de groupes fraternels dont un enfant difficile avait passé par une consultation psycho-pédagogique, c'est sur ce dernier que se concentrèrent la majorité des rejets.

En somme tous ces choix reflètent l'opinion du groupe, elle-même fortement influencée par l'attitude des parents, beaucoup plus qu'ils ne rendent compte de l'atome social réel d'un enfant.

On est tenté de se demander si ces résultats mettent en question la valeur de la sociométrie en tant que science objective. Il n'en est rien car la *spontanéité* fondement du système sociométrique de Moreno[3] se dégage de l'investigation sociométrique des groupes clos que sont les groupes fraternels grâce aux *scores de mutualité*. Prenons un exemple: Baptiste, 4 ans ½, choisit comme 2ème parmi ses 4 frères et soeurs, son frère cadet Nicolas, 3 ans ½, disant: "Parce qu'on chahute bien nous deux". Or ces deux frères dont le sociogramme révéle un score de mutualité, (cf. Fig. 2) ont une tendance très marquée à jouer ensemble, excluant de leur couple les autres frères et soeurs. Ils affirment souvent leur solidarité par une attitude hostile à l'égard de l'entourage, tant des adultes que des autres enfants. Nos observations cliniques rendent compte également de la force des liens sociaux qui unissent ces deux enfants. Non seulement s'amusent-ils fréquemment ensemble mais leurs jeux revêtent souvent un caractère agressif contre tout ce qui est étranger à l' "in-group" qu'ils forment. Leur attitude n'est pas sans analogie avec celle des gangs en miniature évoqués par D. Burlingham.[4]

On constate aussi que dans de nombreux groupes fraternels, l'hostilité entre le 1er et le 2ème né, telle quelle se dégage des observations cliniques est confirmée de façon expérimentale par un rejet réciproque au sociogramme.

[3] Moreno, J. L. Sociometry, experimental method and the science of society. New York, 1951.

[4] Burlingham, D. Twins as a gang in miniature. in: Eissler, Searchlights on delinquency, Imago Pub. 1949.

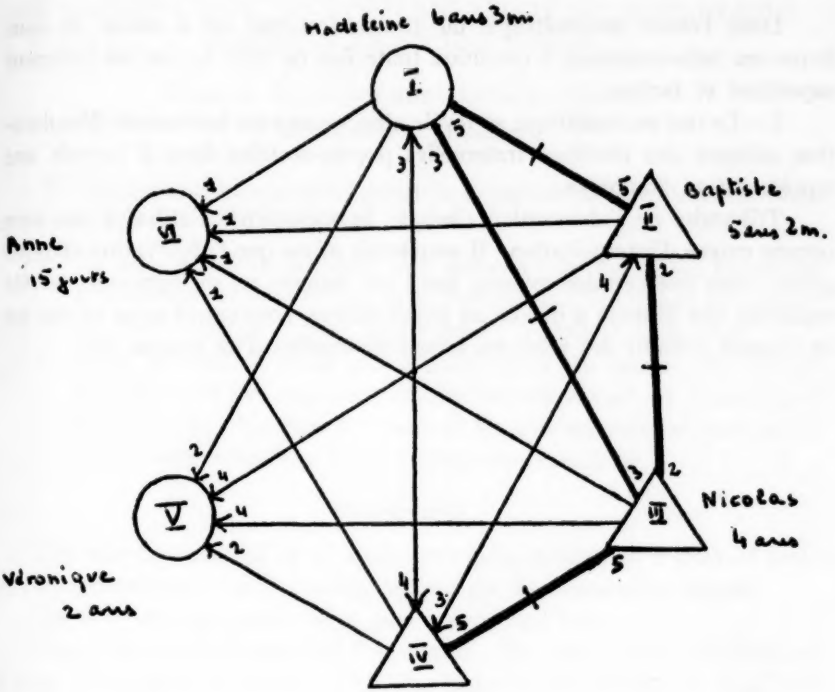

FIGURE 2

Donc si l'on porte l'attention sur les scores de mutualité le sociogramme l'un group fraternel permet le vérification expérimentale de certaines données cliniques telles que l'hostilité et la jalousie entre aîné et second; les relations de bonne camaraderie entre le deuxième et le troisième. D'ailleurs la fréquence de rejets réciproques entre les deux premiers, et de choix réciproques entre le 2ème et le 3ème fait supposer une relation probablement constante entre le rang de naissance de l'enfant et son Indice de Polarisation.

CONCLUSIONS

1.—Appliquée au groupe fraternel la sociométrie fait apparaître deux couches dans les relations entre frères et soeurs:

a) L'une, superficielle et conventionnelle, (scores de polarisation) exprime les réaction du groupe non seulement fraternel mais familial dans sa totalité, envers un enfant donné.

b) L'autre, profonde et réelle, (scores de mutualité) traduit l'attitude affective réciproque véritable des membres du groupe.

Donc l'étude sociométrique du groupe fraternel est à même de nous livrer son infra-structure, à condition toute fois de faire la part de l'élément superficiel et factice.

2.—Le test sociométrique se révéle ainsi comme un instrument d'exploration adéquat des relations fraternelles psycho-sociales dont il fournit une représentation graphique.

Tributaire de l'observation clinique, la sociométrie l'utilise à son tour comme moyen d'interprêtation. Il semblerait même que l'observation clinique puisse, dans une certaine mesure, jouer par rapport au sociogramme, le rôle explicatif que Moreno a dévolu au psychodrame, notamment pour ce qui est de l'aspect évolutif des relations inter-individuelles d'un groupe clos.

AN EXPLORATORY SOCIOMETRIC STUDY OF PEER STATUS AMONG ADOLESCENT GIRLS[1]

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The present exploratory study purports to provide some tentative answers to each of the following questions:

1. To what extent is measured peer status a function of the measuring instruments employed? Or, stated differently, are scores on each of the five measures of peer status closely related to each other?
2. What measurable traits and characteristics are significantly related to each of the five separate measures of peer status? Or, stated more explicitly, to what extent is each of the five measures of peer status significantly related to each of thirty-five variables?

PROCEDURES

The sample consisted of 37 adolescent girls enrolled in a class of first-year homemaking in the University of Georgia Demonstration School.

The five separate measures of peer status used were:

The Generalized Measures of Peer Status. The two *generalized* measures of peer status were as follows: (1) The Ohio Social Acceptance Scale and (2) The Ohio Social Recognition Scale. The Social Acceptance Scale consists of descriptions of each of six separate measures of acceptance ranging from marked intimacy (with a numerical rating of 1) to overt rejection (with a numerical rating of 6). The Ohio Social Recognition Scale consists of 18 brief personality sketches, nine of which are favorable and nine of which are unfavorable. In the administration of the instrument, each respondent was requested to write in the name, or names, of each of her classmates to whom each such personality sketch was applicable. The method of scoring this instrument consisted of a numerical score based on the ratio of favorable to unfavorable mentions which were assigned to each member of the group by her peers.

The Measures of Peer Status in Projected Special Situations. It was considered advisable, in view of the nature of hypothesis 1, that the two *generalized* measures of peer status be supplemented with three measures of

[1] The present article is a slight revision of a paper of similar content presented before the Georgia Psychological Association, Agnes Scott College, Decatur, Georgia, December 8, 1951.

peer status in designated *special* situations. Accordingly, as is indicated below, brief sociometric instruments designed to measure peer status were devised:

(1) in a projected *mental* situation

"If you had to be absent from school for a week during which time a lot of difficult material was taught, list your first, second, and third choices from members of this class whom you would like to help you review for a quiz covering the material you had missed."

First choice ———————
Second choice ———————
Third choice ———————

(2) in a projected *social* situation

"If you were invited to a weiner roast and asked to bring three members of this class with you, list your first, second, and third choices."

First choice ———————
Second choice ———————
Third choice ———————

(3) in a projected *physical* situation

"If an informal basketball game were being played just for fun, list the first, second, and third choices from among members of this class to play on your side."

First choice ———————
Second choice ———————
Third choice ———————

Individual scores on these three measures of peer status were obtained by summing the arbitrarily weighted scores[2] which each individual earned as based on the priority and frequency with which she had been chosen by her peers in each such situation.

In structuring the research design for testing hypothesis 2 (dealing with the assumption that each measure of peer status is related to selected independent variables) the first procedure was to construct a master list of traits and characteristics which, on *a-priori* grounds, were considered to be logically related to peer status. After such a master list had been prepared, measuring instruments which would provide the most reliable data readily

[2] The arbitrary weights assigned were as follows:
(a) A weight of 3 was assigned for each first choice.
(b) A weight of 2 was assigned for each second choice.
(c) A weight of 1 was assigned for each third choice.

obtainable on each such trait or characteristic were sought. Accordingly, the final list of variables consisted of the following:

1. Mental age as based on the California Test of Mental Maturity, Short Form.
2. Intelligence quotient as based on the same instrument.
3. Socio-economic status as measured by the Sims' Socio-Economic Scale.
4. Five areas of personal preference as measured by the Kuder Personal Preference Inventory.
5. School adjustment as measured by the Bell School Adjustment Inventory.
6. Measures of 20 aspects of the respondent's specific or general adjustment as measured by selected items from the SRA Youth Inventory, Bell Adjustment Inventory, and the Mooney Problem Check List.

The various instruments employed in securing data on each of the 35 variables were administered and scored according to instructions furnished in the respective manuals.

Summary of Findings

Inter-correlations Among the Five Measures of Peer Status

It will be recalled that the five measures of peer status herein employed consisted of two *generalized* measures of peer acceptance and three separate measures of peer acceptance in projected *mental, physical,* and *social* situations, respectively. The inter-correlations among these five measures of peer status are shown in Table I. The measures of relationship are based on

TABLE I

Intercorrelations Among the Several Measures of Peer Status

	Measures of peer status				
Selected Variables	Mental Situation	Physical Situation	Social Situation	Social Recognition	Social Acceptance
Projected "Mental" Situation		.32†	.61*	.52*	.61*
Projected "Physical" Situation			.57*	.52*	.60*
Projected "Social" Situation				.39†	.51*
Ohio Social Recognition Scale					.50*
Ohio Social Acceptance Scale					
Fisher Average	.52*	.51*	.52*	.49*	.56*

* Correlations significant at the .01 level.

† Correlations significant at the .05 level.

Rho rank-difference correlations. A Fisher average correlation between each measure and each of the four remaining measures is also shown. It is noted that eight of the ten inter-correlations are significant at the one per cent level of confidence. The correlations are all positive and range in magnitude from .32 to .61.

In general summary of the findings in Table I, it may be said that the obtained correlations indicate that each of the measures of peer status to some extent "overlaps" with each of the remaining measures. The gross amount of such "overlapping," as measured by the coefficient of determination (r^2), varies from ten per cent to 37 per cent. Stated differently, no single measures of peer status here used displays a high degree of identity with any of the remaining measures.

Inter-correlations Between the Five Measures of Peer Status and Selected Measures of Specific and General Adjustment

In the previous statement concerning sources of data, reference has been made to the administration of several instruments purporting to measure one aspect or another of adjustment of adolescent girls. In Table II, 24 of the variables resulting from the application of these instruments are grouped to show measures of relationship between the five indices of peer status and the following types of adjustment:

Four measures of *school* adjustment
Three measures of *home* adjustment
Three measures of *health* adjustment
Three measures of *emotional* adjustment
Eight measures of *social* adjustment
Three measures of *general* adjustment

The most striking finding to be noted from Table II is that only six of the 120 correlations are significant at the five per cent level. It is also noted, that contrary to our assumption that positive relationship would be found between each of the variables and each of the five measures of peer status, slightly more than one-third of the correlations are negative, even though most of these are unreliable and of small magnitude.

It is significant that five of the six reliable correlations are based on peer status in a projected *mental* situation, while the one remaining reliable correlation deals with peer status in a projected *social* situation. Neither of the three remaining measures of peer status is reliably related to any of the 24 measures of adjustment for this sample.

TABLE II

INTERCORRELATIONS BETWEEN THE FIVE MEASURES OF PEER STATUS AND SELECTED MEASURES OF (A) SCHOOL ADJUSTMENT; (B) HOME ADJUSTMENT; (C) HEALTH ADJUSTMENT; (D) EMOTIONAL ADJUSTMENT; (E) SOCIAL ADJUSTMENT; AND (F) GENERAL ADJUSTMENT

Selected Variables	Measures of Peer Status				
	Mental Situation	Physical Situation	Social Situation	Social Recognition	Social Acceptance
A. *School Adjustment*					
School Adjustment Inventory (Bell)	.17	—.08	—.21	.29	—.14
My School (SRA Youth Inventory)	.01	.02	—.05	.02	.08
Adjustment to School Work (Mooney)	.54*	.20	.22	.16	.16
Curriculum and Teaching Procedures (Mooney)	.25	—.11	.04	—.01	—.12
B. *Home Adjustment*					
Home Adjustment (Bell)	.44*	.02	.18	.07	.28
Home and Family (SRA Youth Inventory)	.10	—.07	.05	.04	.08
Home and Family (Mooney)	.43	.22	.25	.30	.29
C. *Health Adjustment*					
Health Adjustment (Bell)	.33†	.13	.22	.15	.18
Health (SRA Youth Inventory)	.02	—.04	.02	.11	—.09
Health and Physical Development (Mooney)	.15	—.03	.01	—.01	—.16
D. *Emotional Adjustment*					
Emotional Adjustment (Bell)	—.11	—.04	—.21	.01	—.06
About Myself (SRA Youth Inventory)	.07	.01	.01	.20	—.03
Personal-Psychological Relations (Mooney)	.06	—.03	.06	.13	.15

* Correlations significant at the .01 level.

TABLE II (*Continued*)

Selected Variables	Measures of Peer Status: Mental Situation	Physical Situation	Social Situation	Social Recognition	Social Acceptance
E. *Social Adjustment*					
Sociable Preference (Kuder)	—.36†	—.26	—.31	—.17	—.24
Social Adjustment (Bell)	—.21	.04	—.40†	.04	—.21
Getting Along with Others (SRA Youth Inventory)	—.37†	—.11	—.12	—.05	—.14
Boy Meets Girl (SRA Youth Inventory)	—.04	—.16	.06	.04	.10
Social and Recreational Activities (Mooney)	.07	.02	.18	.07	.07
Social and Psychological Relations (Mooney)	.12	.13	.16	.18	.08
Agreeable (Kuder)	.11	—.13	.12	—.11	.25
Dominant (Kuder)	—.24	.00	—.12	.04	—.22
F. *General Adjustment*					
Total Adjustment (Bell)	.17	.04	.04	.15	.30
Things in General (SRA Youth Inventory)	—.22	—.24	—.10	.11	—.16
Total Problem Score (Mooney)	21	—.05	—.12	.07	.09

† Correlations significant at the .05 level.

When the several categories of adjustment are compared among themselves as respects the direction of the relationships obtained, it is found that with the exception of the category of social adjustment (in which 20 correlations are positive and 20 are negative) the five additional categories of adjustment show a higher proportion of positive than of negative relationships.

The statistically significant findings reported in Table II may be interpreted as follows:

1. Students with high Mooney school adjustment scores are preferred as companions in preparing for a quiz.
2. Favorable home and health adjustment scores on the Bell Personality Inventory are markedly associated with favorable peer status in a projected *mental* situation.
3. Preference for sociable activities as measured by Kuder Personal Preference Inventory, and social adjustment as measured by the

SRA Youth Inventory are each inversely related to favorable peer status in a projected *mental* situation.

4. An interesting finding was that favorable social adjustment scores on the Bell Inventory were significantly and inversely related to favorable acceptance status in a projected *social* situation.

Inter-correlations Between the Five Measures of Peer Status and Eleven Selected Variables

The inter-correlations between each of eleven variables and each of the five measures of peer status are shown in Table III. These eleven variables consist of two measures of mental ability, one measure of socio-economic status, and eight remaining sub-scores from the Mooney, Kuder, and SRA

TABLE III

Intercorrelations Between the Five Measures of Peer Status and Selected Independent Variables

Miscellaneous Independent Variables	Measures of Peer Status				
	Mental Situation	Physical Situation	Social Situation	Social Recognition	Social Acceptance
Mental Age (Calif.)	.55*	.10	.25	.17	.11
Intelligence Quotient (Calif.)	.65*	.06	.43*	.09	.09
Verification (Kuder)	.52*	—.07	.17	.08	.26
Practical Preference (Kuder)	.31	.05	.09	.15	.23
Theoretical Preference (Kuder)	—.06	—.09	—.13	—.01	—.13
Looking Ahead (SRA Youth Inventory)	.02	.09	.13	.05	.05
Courtship, Sex, Marriage (SRA Youth Inventory)	.05	.03	.06	—.11	—.21
Morals and Religion (Mooney)	.10	—.06	.18	.13	—.09
Socio-Economic Status (Sims)	.24	.10	—.03	.29	.13
Finances, Living Conditions and Employment (Mooney)	.47*	.23	.24	.03	.15
The Future-Vocational and Educational (Mooney)	—.03	.05	.04	.25	.15

* Correlations significant at the .01 level.

† Correlations significant at the .05 level.

Youth Inventory, which did not fit into any of the several measures of adjustment listed in Table II. It is of special interest to note that of the 55 correlations shown, only five are significant at the one per cent level of confidence. Four of these five correlations deal with peer status as measured in a projected *mental* situation while the other deals with peer status at the projected *social* situation. None of the correlations dealing with the three remaining measures of peer status is reliably related to any of the eleven variables considered. Twelve of the 55 correlations are negative.

The statistically significant findings shown in Table III appear to warrant the following generalizations:

1. Mental age is highly related to favorable peer status in a projected *mental* situation.
2. Persons with high I. Q.'s are more likely than persons with low I. Q.'s to be chosen as preferred companions in both a *mental* and a *social* situation.
3. High verification score on the Kuder Personal Preference Inventory is associated with favorable status in a projected *mental* situation.
4. Adolescent girls who indicate few personal problems in the field of Finances, Living Conditions and Employment tend to be chosen as preferred companions in preparing for a quiz.

Conclusions

Two conclusions appear warranted:

1. Sociometric research dealing with correlates of peer status must recognize that peer status is *per se* situational or specific in character.
2. The relatively low relationships established between the five measures of peer status and the 35 variables suggest the need for further research to determine what characteristics are significantly related to peer status.

LEVEL OF ASPIRATION AND SOCIOMETRIC DISTANCE

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This study was an attempt to determine the relationship between certain indices from the Cassel Group Level of Aspiration Test and a Sociometric Distance Index from a quantified sociogram for 155 pupils selected at random from the sixth and eighth grades of the Fontana Public Schools.

Cassel Group Level of Aspiration Test (CGAT)—The CGAT is the standard form published by Western Psychological Corporation, Los Angeles, California (1). It is made up of twelve separate parts, all precisely alike. Only eight of these parts were utilized in the present administration of the test. Each part of the test consists of four lines of capital X's that are double spaced, as illustrated in Figure 1. The task is to draw a small circle at the top and bottom of each X as rapidly as possible for thirty seconds of time. The Hausmann Technique is utilized for administering, i.e., individuals are instructed that their score will not be greater than their bid, and will be two points less than their performance for each X bid and not completed (2).

The following indices from the CGAT were utilized in this survey:

Unstructured First Goal: The goal or number of X's bid for Part I of the test. This index is presumed to be a qualified measure of the individual's level of aspiration uninfluenced by previous performance; the position he places himself on an aspiration scale relative to other persons.

Mean Aspiration "D"-Score: Mean discrepancy between previous performance and current goal for Parts II through VII disregarding the direction of the discrepancy, i.e., plus or minus. This index is presumed to be a measure of the "irreality dimension" of the individual's personality (3), the discrepancy between the world as the individual perceives it and the

FIGURE 1

AN ILLUSTRATION OF PART I OF THE CASSEL GROUP LEVEL OF ASPIRATION TEST

PART I

GOAL	X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X	(30)
EXPECTED	X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X	(60)
_____	X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X	(90)
(No. of X's)	X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X	(120)

Number of X's Completed _____ Score ( )

world as it really is. It is a measure of the level of aspiration of the individual as influenced by his previous performance. The goal score is believed to be representative of the world as the individual perceives it; while the performance represents the world as it actually is.

Clinical "D"-Score: Computed exactly like the Mean Aspiration "D"-Score except that the direction of the discrepancy (plus or minus) is taken into consideration. This score appears to have a greater qualitative than its quantitative significance; since the characteristic plus and minus oscillation of the discrepancy tends to balance-out or neutralize the quantitative discrepancy value. The main experimental value of this score, to date, has been to identify two levels of "atypical responses" relative to the aspiration of the individual, i.e., raising of a goal immediately subsequent to a failure performance, and the lowering of a goal immediately subsequent to a success performance (4). In addition, Clinical "D"-Scores with a minus sign are presumed to indicate fear personality patterns characterized by emotional and intropunitive behavioral responses; while those with a plus sign are presumed to indicate non-fear personality patterns characterized by extrapunitive and cognitive behavioral responses.

Reliability indices have been computed only for the Mean Aspiration "D"-Score and the Clinical "D"-Score. For the Unstructured First Goal, a Product Moment r was computed between the first goal for the CGAT and the first goal for the Rotter Aspiration Board for 100 tactical instructors in the Air Force. The resulting r was .22 + .111. The curvilinear eta for the same distribution n_{yx} was .36 + .102. The reliability indices for the Mean Aspiration "D"-Score and the Clinical "D"-Score were computed using more than 1,000 different records, and from a variety of different populations. The Product-Moment technique was utilized with the Spearman-Brown Correction for odd and even items on the CGAT. The r's for the first index cited range from .64 + .086 to .82 + .021, and for the second index from .70 + .044 to .89 + .022. The higher reliability r's for both indices were derived from the "out-of-prison" groups of individuals; while the lower r's came from the "in-prison" ones. Further data relative to the reliability of these indices may be found in the test manual and other reports (5 and 6).

Some validation studies of the CGAT indices have also been made. The most fruitful validation areas have been in the discerning between "in-prison" and "out-of-prison" groups of individuals (5 and 6). "In-prison" individuals tend to have a relatively high Unstructured First Goal, usually above 30; a high Mean Aspiration "D"-Score, usually above 5.00; and

usually two or more "atypical" Clinical "D"-Scores (4). The "out-of-prison" individuals tend to have an average Unstructured First Goal, from 20 to 30; a fairly low Mean Aspiration "D"-Score, below 4.00; and rarely have more than one atypical Clinical "D"-Score, or response, and usually of the type where the goal is raised in the face of failure (1, 5, and 6).

Quantified Sociometric Technique (SDI). A sociogram (7) was administered by telling the students that the teacher had planned to assign them to "work-groups" for purpose of completing projects at some future date. Each student was requested to name three persons from his room which he most wanted to work with in order of his choice, and numbering them first, second, and third choices. They were also asked to name any individuals that they would rather not work with, and to mark them negative choices. The latter choices were marked on the back of the page. Mathematical weights were assigned to these choices for each person in the study as follows:

First choice	5 points
Second choice	3 points
Third choice	1 point
Negative choices	—3 points

The algebraic sum was computed for all choices made on each individual by his peers from that class, and fifty points were added so as to eliminate negative scores. This score is referred to as the Sociometric Distance Index (SDI).

Group Selection—Three sixth grade classes with a total population of ninety pupils, and two eighth grade classes with a total of sixty-five pupils were selected at random from the Fontana Public Schools. Boys and girls were about equally divided.

Findings

Cassel Group Level of Aspiration Test. Scores for the CGAT are shown in Table I. All means fall well within the normal ranges as shown in the manual for the test (5). Only two of the ninety sixth grade pupils received Mean Aspiration "D"-Scores above 9.00; while fourteen of them received scores above 4.5. None of the eighth grade pupils received Mean Aspiration "D"-Scores above 6.5. According to the test manual, a Mean Aspiration "D"-Score of 9.0 or above reveals a personality character relative to the "irreality dimension" significantly indicative of delinquency proneness at the 1% level of confidence; while a score of 4.5 or greater is indicative at the 10% level of confidence.

TABLE I

COMPARISONS BETWEEN THE SIXTH AND EIGHTH GRADES FOR INDICES FROM THE CGAT AND THE SDI

Indices	Grade	Range Scores	Number Cases	Mean Score	Standard Deviation
CGAT INDICES					
Unstructured First Goal:					
	Sixth Grade	10 to 60	90	30.3	10.5
	Eighth Grade	15 to 35	65	25.9	2.4
	Difference			4.4	8.1
	Critical Ratio			4.0	10.1
Mean Aspiration "D"-Score:					
	Sixth Grade	0 to 17	90	2.61	1.7
	Eighth Grade	0 to 6.5	65	1.71	1.4
	Difference			0.91	0.3
	Critical Ratio			37.0	1.67
Clinical "D"-Score:					
	Sixth Grade	—4.5 to 5.0	90	0.09	2.1
	Eighth Grade	—5.2 to 6.0	65	—0.19	1.7
	Difference			.28	.4
	Critical Ratio			1.00	1.9
SOCIOMETRIC DISTANCE INDEX					
	Sixth Grade	28 to 77	90	53.9	5.1
	Eighth Grade	30 to 77	65	57.6	6.1
	Difference			3.7	1.0
	Critical Ratio			4.4	1.25

Quantified Sociometric Distance Index—The SDI's ranged from 28 to 77. Means and SD's for SDI's for both grades are given in Table I. The weightings of 5, 3, and 1 for the first three choices were assigned arbitrarily; while the negative weight of —3 was determined by varying the negative weight to yield a balance of plus and minus scores that would tend to resemble the Gaussian Normal Curve distribution. The SDI derived was presumed to indicate the social distance of the individual relative to the other members of his class referred to as his peers, or class peers.

Comparisons Between the Sixth and Eighth Grades—Table I indicates a comparison between the two grades for all indices utilized in the study. Statistically significant differences were obtained between the sixth and eighth grade groups for the means of all indices utilized in the survey except the Clinical Aspiration "D"-Score. The differences favored higher aspiration

scores and lower SDI's for the sixth grade than for the eighth grade on a greater than chance expectancy basis at the 1% level of confidence. The SD's of the various indices between the two grades were significantly different only for the Unstructured Goal for the CGAT. No significant differences were obtained between classes from the same grade.

The grade differences seem to indicate that sixth grade pupils tend to have higher, or less modified, goals than the eighth grade pupils, and that this higher aspiration predicates a lower popularity among their peers. Correlation studies from Table II seem to bear out this interpretation.

TABLE II

COMPARISONS BETWEEN THE MEAN ASPIRATION "D"-SCORE ON THE CASSEL GROUP ASPIRATION TEST AND A QUANTIFIED SOCIOMETRIC DISTANCE INDEX

Correlation Technique	Correlation Index	Standard Error	Correlation Corrected—Attenuation & BC
	SIXTH GRADE		
Product-Moment	r —.461	± .084	Corr. r —.925
Curvilinear-Eta	n_{yx} .388	± .090	Corr. n_{yx} .22
Curvilinear-Eta	n_{xy} —.89	± .022	Corr. n_{xy} —.87
	EIGHTH GRADE—January 1952		
Product-Moment	r —.011	± .130	Negligible
Curvilinear-Eta	n_{yx} .363	± .114	Corr. n_{yx} .22
Curvilinear-Eta	n_{xy} —.333	± .118	Corr. n_{xy} —.28
	EIGHTH GRADE—March 1952		
Product-Moment	r —.067	± .124	Negligible
Curvilinear-Eta	n_{yx} .27	± .116	Corr. n_{yx} .31
Curvilinear-Eta	n_{xy} —.33	± .111	Corr. n_{xy} —.22

Comparisons Between Mean Aspiration "D"-Score and SDI—The primary objective of this study was to determine the relationship between the chief index of the CGAT, the Mean Aspiration "D"-Score and the SDI. Table II indicates this relationship for each grade separately. While there appears to be statistically significant relationship between the two indices mentioned for both the sixth and eighth grade classes, the relationship appears to be markedly higher for the sixth grade. The same test was repeated for the eighth grade three months later with little change, and no significant relationships were obtained for classes within either of the grades. All corrections reported include broad categories and attenuation.

These findings would seem to indicate a significant relationship between

the level of aspiration of the individual and his social distance relative to his peers. Optimum social distance appears to obtain in a curvilinear pattern rather than in a linear fashion. Variation in the social distance appears to vary with the level of aspiration of the individual, and appears to favor a moderate level of aspiration, rather than a really high or extremely low level of aspiration.

Comparisons Between Other Aspiration Indices and the SDI—Table III indicates comparisons between the SDI and other CGAT indices. None of these relationships appear to have statistical significance, and therefore have not been corrected for broad categories and attenuation.

TABLE III

COMPARISONS BETWEEN OTHER INDICES FROM THE CASSEL GROUP LEVEL OF ASPIRATION TEST AND THE SOCIOMETRIC DISTANCE INDEX FOR 90 SIXTH GRADE STUDENTS

Paired Variables	Correlation Technique	Correlation Index	Standard Error
Unstructured First Goal & Social Distance Index	Product-Moment	r .036	± .111
Unstructured First Goal & Social Distance Index	Curvilinear-Eta	n_{yx} .15	± .104
Unstructured First Goal & Social Distance Index	Curvilinear-Eta	n_{xy} .136	± .087
Clinical "D"-Score (Neg. & Pos.) & Social Distance Index	Bi-Serial	r_{bis} .119	± .063

SUMMARY

This study sought the relationship between three indices from the CGAT and a quantified SDI for 155 sixth and eighth grade pupils selected at random from the Fontana Public Schools. Comparisons were also made between the sixth and eighth grade classes for all indices utilized in the study.

Statistically significant differences were obtained between the sixth and eighth grades for the means of the Unstructured First Goal, the Mean Aspiration "D"-Score and the SDI. These differences indicated higher level of aspiration scores for the sixth graders and lower SDI's than for the eighth graders.

The correlation studies of relationship between the CGAT indices and the SDI indicated a statistically significant relationship between the Mean

Aspiration "D"-Score and the SDI of a curvilinear pattern. Optimum SDI appear to obtain where the level of aspiration is moderate, and neither real high or extremely low. Relationships between other indices utilized in the study did not appear to be significant.

The popularity of sixth and eighth grade pupils appears to be directly related to the irreality dimension of the individual's personality. The irreality dimension of the personality may be a function of the psycho-sexual development of the individual which is susceptible to radical and significant change near the onset of the puberty cycle of the individual. This may account for the significant differences between the sixth and eighth grades.

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AN ECOLOGICAL DETERMINANT OF DIFFERENTIAL AMOUNTS OF SOCIOMETRIC CHOICES WITHIN COLLEGE SORORITIES

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Physical proximity and functional distance have been shown to influence friendship groupings in a variety of situations (1, 2, 3). The purpose of this study was to determine the degree to which the members of a group form sub-groupings when one class of members lives within the physical structure of the group and the other class does not. A secondary purpose was to ascertain whether preferential friendships upon the basis of this ecological difference is symmetrical; that is, whether the degree of sub-group formation within one class was accompanied by a corresponding sub-grouping in the other.

METHOD

A type of organization which fulfills the requirements of having two classes of members, one living within a given unit and the other not, is the college academic sorority located in a large city. Such a sorority is composed of house members and town members. The former are out-of-town students who live in the sorority, while the latter live at home within commuting distance of the university. One of the primary motivations, in addition to others, of house members for living in the sorority is of course the board and room. Town members more importantly join for social activities and opportunities for friendships (4).

There are twenty such sororities on the campus of the University of Minnesota and nineteen of these were given a questionnaire during their business meetings. The mean per cent returned by the sororities was 90, the median return was 91 per cent, the range of returns among sororities was from 76 to 100 per cent.

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[1] This report is one of a series of research studies in student life being conducted by the Office of the Dean of Students, University of Minnesota. Various staff members gave helpful advice and assistance with this study, including Betty Jo Jackson and Karol Kaiser of the Student Activities Bureau and Edward Swanson. The cooperation of the Panhellenic Council and of the sororities is gratefully acknowledged.

This study was supported in large part by a research grant from the Graduate School of the University of Minnesota.

The membership size of the sororities ranges from 14 to 58 with the median size being 52.5. The per cent of house girls living within the sororities varies considerably, from 18 to 59 per cent.

The question used to obtain the data relevant to this study was: "Name your best girl friends at this University. You may name as many as you like, but please list at least three. Indicate by an "S" which friends are members of your sorority." Almost all girls answered this question. However, those who did not were not included in the sample.

The method of obtaining an index for representing the degree to which each of the two classes of members chose one another was as follows (5). For each girl a percentage was computed representing the number of girls she chose within her class, divided by the total number of members she chose. These percentages were averaged for house and town members separately for each sorority. Since the sororities differ in the proportion of house and town members, it was necessary to correct this mean per cent by the proportion of in-group choices expected on the basis of chance alone. Chance expectancy was for the house group, $\frac{\text{N house} - 1}{\text{N Total} - 1}$ and for town, $\frac{\text{N town} - 1}{\text{N Total} - 1}$. The chance expectancy was then subtracted from the mean per cent in-group choice.

Results

Table 1 shows that the house girls over-choose themselves much more than the town girls over-choose themselves. The median per cent of excess choices for the house is 39 while for the town only 9 per cent. In 18 out of the 19 sororities, the house group over-choosing was greater than the town group. This difference would be highly significant statistically. Thus, we may conclude that the house group, relative to its proportionate membership, forms many more friendships within it than would be expected by chance, while the town group only slightly over-chooses itself.

To determine the degree to which the formation of friendships within one group was accompanied by a commensurate amount of friendships in the other group, a rank-difference correlation between these corrected proportions was computed. This correlation turned out to be only .35 which is not significant but is in a direction suggesting a slight presence of mutuality. When the four sororities that have three or fewer house members represented in the sample are eliminated the correlation remains unchanged.

TABLE 1

HOUSE AND TOWN GREATER THAN CHANCE CHOICE WITHIN SAME GROUP

Sorority	Population NH	Population NT	Sample NH	Sample NT	% > Chance* H to H	% > Chance* T to T
1	11	27	10	23	36	10
2	14	23	11	17	53	15
3	11	29	7	20	17	9
4	13	33	9	23	52	1
5	10	38	8	27	50	14
6	9	38	3	25	26	8
7	3	21	3	17	36	—4
8	11	38	2	30	46	8
9	10	44	10	37	21	4
10	12	35	12	30	39	4
11	5	9	5	7	28	10
12	11	42	9	40	55	17
13	16	37	13	31	61	21
14	12	12	12	9	45	17
15	12	35	10	29	36	8
16	4	14	3	11	43	16
17	19	34	13	23	33	—4
18	6	28	6	20	42	1
19	10	7	6	5	23	36
				Median	39	9

* Rho equals .35 based upon ranks derived from per cents carried to two decimal places.

DISCUSSION

The fact that house groups over-choose themselves more than town groups is readily understandable. House members live in the house and spend much more time together than they do with the town girls, while town members probably interact with house members almost as often as with town members.

Upon consideration, the low relationship existing between house group formation and town group formation is not surprising. It seems plausible that e.g., the house group could be extremely cohesive without that condition necessarily influencing the cohesiveness of the town group. In fact, there are factors which could obscure such a symmetrical relationship if it did exist. For example, some girls may be popular with the members of both groups and yet not reciprocate those choices proportionately.

The lack of a strong relationship between sub-group preferences in no way implies the absence of cleavage between house and town members. It is

clear from Table 1 that a certain amount of cleavage is present with the house group contributing much more to this state than the town group.

Summary and Conclusions

1. Within an organization having a residence where some of the members live in the residence while others live outside of it, those living within the residence tend to have, proportionate to their numbers in the group, many more friendships among themselves than non-resident members.

2. However, the degree to which the members of one of the sub-groups over-choose themseves is not highly related to the degree to which the other members of the group over-choose themselves. The fact that this relationship is low suggests that this ecological difference is not an important condition for symmetrical preference.

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SOME SOCIOMETRIC ASPECTS OF SOCIAL RANKING IN A SMALL, FACE-TO-FACE GROUP[1]

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The present paper reports an empirical test of two hypotheses lying in an area of group behavior which can be designated as the tendency for members to locate each other in an hierarchical order with respect to criteria relevant to the group's activity. Thus, the universe of study consisted of all the behavior of a small, face-to-face group which resulted in the establishment of an hierarchical order of rank. Within this frame of reference many analytical propositions could be set up concerning the ways in which a hierarchy of rank develops out of the interrelations among the elements of social behavior in a given group. We were concerned, however, with only two questions:

1. What is the relationship between an individual's performance in the group's norms and his position in the hierarchy of rank?
2. In what way is interaction related to the position of an individual in the hierarchy of rank?

On the basis of these questions, two specific hypotheses were formulated for testing.

1. The closer an individual comes to realizing in his behavior the norms of the group as a whole, the higher will be his rank.
2. The higher the individual's social rank, the more frequently he will originate interaction for others, and the more frequently others will originate interaction for him.[2]

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[1] The following students in an advanced course in the "sociology of small groups" were active co-workers with the author on this project: Jack Campbell, Jerry S. Cloyd, Ned Conger, Rod Franklin, J. L. Gallant, Caryl Giltner, Warren Joy, Herbert Lemon, Norman L. Sothan, Virginia Stryker, Robert R. Wilson, Lois Zabel. The author is also indebted to the University of Nebraska Research Council for financial assistance received.

[2] The relationships stated in one or both of these hypotheses are implicit in such existing researches as the following: Helen H. Jennings, *Leadership and Isolation*, New York, Longmans, 1943; Harold F. Kaufman, "Defining Prestige Rank in a Rural Community," SOCIOMETRY, VIII, May 1945; John W. Kidd, "An Analysis of Social Rejection in a College Men's Residence Hall," SOCIOMETRY, XIV, May-August, 1951; George A. Lundberg and Margaret Lawsing, "The Sociography of Some Community Relations," *American Sociological Review*, June 1937; J. L. Moreno, *Who Shall Survive?* Beacon House, 1934, and 1952. Fred M. Thrasher, *The Gang*, Chicago, University of Chicago

I. The group studied.

The group chosen as the setting for a test of these hypotheses was drawn from students in two "social disorganization" classes who preferred this alternative to doing an individual term project. Each student who volunteered checked through a list containing the names of the other volunteers, indicating for each person whether he knew that person "very well," "quite well," had only a "slight acquaintance," or was "not acquainted at all." An attempt was made to choose the group in such a way that no member had previous acquaintance with any of the others. In practice, this was not entirely possible, because despite a list of more than fifty volunteers only about eighteen persons were available at the time chosen for group meetings. Of the persons chosen, one knew another member "very well," four knew another person "quite well," and seven claimed a "slight acquaintance" with another member.

The group was assembled for two 1½ hour sessions a week (Tuesday and Thursday) for eight weeks, giving the group members a total contact of approximately twenty-four hours. At the beginning of each group meeting a moving picture was shown, ranging in length from fifteen to thirty-two minutes (chosen as to be related at least indirectly to the subject matter of the course in social disorganization in which all subjects were enrolled.) It was carefully explained at the beginning of the first session that the instructor was very much interested in the possible use of motion pictures in the social disorganization course, and wanted the assistance of the subjects in evaluating a representative group of films with this end in mind. It was further explained that in connection with this project a great deal of information would be obtained from observations of the group, so as to help the instructor in his problem of evaluating the usefulness of visual aid materials.

Each subject was then given a copy of a list of six questions to be used by the group as a basis for evaluating each film. Both verbal and written instructions to the subjects specified that the group as a whole was to spend one hour after the completion of each film evaluating it and presenting a

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Press, 1927. The present writer is indebted to George C. Homans for both hypotheses. Number 1 is stated in its present form by him and Number 2 in a closely related form in *The Human Group*, New York, Harcourt Brace, 1950. Homans' hypotheses are developed *ex post facto* from a detailed examination of existing studies. In the present study we proposed to find out if they would hold up in a new situation where the data were gathered specifically to test them, and to test them in quantitative terms.

written report consisting of answers to the prepared questions. The report was to be a group product, and each member's grade for a session would be the grade given the report. At each session, the subjects would be notified of the grade given to the report on the last movie seen.

The instructor did not remain in the room during the discussion period, and no effort was made to specify in any way how the group was to be organized in order to carry out its assigned task. As it turned out, after the first session the members decided to rotate the chairmanship in alphabetical order.

II. Methods for obtaining data.

An acquaintance test,[3] already mentioned, preceded formation of the group to be studied.

Questionnaire No. 1. At the first session of the newly-formed group each individual answered a number of personal-social background questions, covering age of the subjects, number of persons in the parental family, campus activities, offices held in organizations, major fields of study, year in school, and religious affiliation. The questionnaire also included an item asking the subject to present in a detailed and specific way his ideas on the things that make for a good, informal discussion group as compared with a poor, informal discussion group. The answers were analyzed by two persons who sought to derive from them the possible existence of normative behavior prescriptions, presumably developed in other discussion groups similar to this one.

Magnetic tape recordings. Each discussion session following the completion of the film was recorded in entirety on magnetic tape. Subsequently each tape was independently analyzed by three persons participating in the study. The task of these persons was to derive from the tape record if possible the norms of the group, particularly those norms which seemed to have special importance in affecting rank. It was not to be expected, of course, that group norms would frequently be explicitly verbalized. Consequently, it was a subtle and difficult task to extricate them from the flow of conversation in which they were hidden. This is why three persons were used as tape analyzers, so that they might check with each other on their data, which necessarily consisted largely of inferences.

Observer No. 1—"interaction observer." This observer attended all group sessions. His task was to record, using a simple code, the origin and

[3] See the chapter "Acquaintance Test" J. L. Moreno, *Who Shall Survive?*, p. 137-41, first edition, 1934.

destination of all verbal communications (interaction) that occurred during the discussion sessions. He also recorded some non-verbal communications of a stereotyped nature. Using a set of standardized categories represented by a second set of symbols, he further classified each communication with respect to content, although this data was not used in the subsequent test of the present hypotheses.

The technique for recording interaction was indeed very crude by comparison with some of the more elaborate methods in existence. For instance, a long and complex statement by a member was recorded as a single communication, thus being treated in exactly the same way as a simple, one-word statement of agreement or dissent. The necessity for haste in fielding the study within the limits of the semester in which it occurred made the use of a more elaborate method with its necessary training period impractical.

Observer No. 2—"content observer." This observer also attended all group sessions. His task was to closely observe the behavior of the group as a whole with particular attention to behavior that seemed to have a bearing on social ranking. Although he was guided in his observations by a list of questions, he was left relatively free to range over the entire behavior of the group. He was depended upon to give a running account and analysis of each session since he was better able than anyone else to perceive the whole situation without having to concentrate on the abstraction of certain of its aspects.

Near-Sociometric test. At the third session of the group, the subjects were asked to give in private their answers to the following question: "List in rank order the names of the members of the group who are contributing most to carrying out the assigned task of the group." The person contributing most of all was to be listed first, and so on. They were also asked to list in rank order those persons who were contributing least to carrying out the assigned task of the group. At the tenth and fifteenth sessions the same question was asked, but the subjects were requested to rank all members except themselves in order of contribution to the group's assigned task. Data from this test were used as one of the principal criteria of rank in the group.

Questionnaire on norms. This questionnaire was filled out at the sixteenth session of the group. On it were listed eighteen statements which analysis of the tape recordings and the personal background questionnaire suggested as probable norms of the group. For each statement subjects were asked to indicate whether they thought it was of "little importance," "some

importance," or was "very important" for the functioning of the group. Also, subjects were asked to indicate for each statement their estimate of the approximate proportion of the total group that shared their opinion of the statement's importance. Finally, for each statement, subjects were asked to list in order the three persons who best lived up to the norm and the three persons who did least well in the norm.

At the last session of the group, subjects were also requested to list in order the three members who were the most effective as "leaders," without in any way delimiting the meaning of this term.

III. Analysis of Data.

Hypothesis 1 deals with the relationship between social rank and performance in the norms of the group. Nine of the eighteen behavior prescriptions contained in the questionnaire on norms were chosen as the basis for testing this hypothesis. These nine came closest to satisfying the requirements for normative prescriptions of behavior in two ways. (a) They were the ones considered by members to be most important for the functioning of the group. In three cases, all members rated them as "very important"; in two cases eleven members rated them as "very important" and one as of "some importance"; in two additional cases, ten members rated them as "very important" and two considered them as of "some importance"; and in the last two instances, nine members gave them a "very important" rating, while three considered them as of "some importance." No one considered these nine as of "little importance" in the group's life. (b) They also ranked among the highest in the subjects' opinions of the proportion of the total group that shared their own beliefs regarding the importance of the norms (this being a rough indication of the degree to which these standards were consciously shared by members). This evidence is summarized below.

For each norm the subjects listed the three persons who best lived up to the standard as well as the three who did least well. Arbitrarily weighted scores were assigned to each individual on the basis of the number of choices he had received from his fellows with respect to each norm. This was done for all of the norms, yielding nine sets of scores which were then placed in rank order.

The next step was to calculate the relationship between each of these rank orders and some criterion of social rank within the group. The criterion chosen was the third near-sociometric test ("rank the members of the group in terms of their contribution to carrying out the assigned task of the group"). Spearman rank-difference correlation coefficients were then computed for

TABLE I

DISTRIBUTION OF SUBJECTS IN TERMS OF THEIR ESTIMATES OF THE PROPORTION OF TOTAL GROUP SHARING THEIR OWN OPINIONS OF THE IMPORTANCE OF NINE NORMS

Norm Number	Proportion of Total Group				
	100.0%	75.0%	50.0%	25.0%	0.0%
1	3	4	5	0	0
2	9	3	0	0	0
3	6	4	1	1	0
4	7	3	2	0	0
5	9	2	1	0	0
7	8	4	0	0	0
8	7	4	0	1	0
6	4	6	0	2	0
9	4	6	1	1	0

each of the nine normative rankings with the ranking based on the third near-sociometric test. The nine norms together with the correlation coefficients are listed below.

	Rank-difference Correlation with third Near-Sociometric Ranking
1. Every member ought to contribute as much as he can to the task of the group	.95
2. Members of this group should cooperate in establishing organization in the group	.92
3. The chairman of the group should formulate a concensus of opinion	.87
4. Members should help maintain group organization	.83
5. Each member should preserve an amiable attitude toward other members	.78
6. The chairman of the group should function to draw out opinion	.66
7. Everyone in this group should do his part in promoting a friendly atmosphere	.33
8. Every member has an obligation to preserve an open-minded, tolerant attitude on issues discussed in the group	.29
9. No member, including the chairman, should attempt to dominate the discussion	—.35

With the exception of the last three, these coefficients are significant at the five per cent level. Clearly, there is much variation in the degree to which rankings based on performance in some of the group's norms are related to one criterion of social rank. The rho's are sufficiently high in the first

six cases to suggest that the hypothesis cannot be discarded. The others, although not high enough to justify confidence in their significance, are in the expected direction, even in the case of No. 9 where the correlation is negative. Some light may be shed on this latter case by the finding in connection with hypothesis 2 that high rank is associated with a tendency to send and receive the largest number of communications. It seems likely that members realized that a few of their number talked and were talked to more than the others and equated this perception with the phrase "dominate the discussion." Thus, the higher the rank, the greater the tendency to dominate the discussion. The fact that the correlation coefficient is so low may be due to the unfavorable connotations of "dominating" the discussion.

Hypothesis 1 cannot be rejected, but we may raise the question of why it was not more firmly supported. One possible answer lies in the method by which the norms of the group were ferreted out, so to speak, from the records of its sessions. Attempting to derive these by analysis of the tape recordings was laborious and by no means entirely satisfactory; the norms were rarely stated explicitly. At no time in the attempt to put them in the form of direct prescriptions of behavior did the investigators escape a feeling of tentativeness and even uncertainty as to whether the "real" norms had been uncovered.

Perhaps a more important point is that the group's system of norms simply was not very clearly established, and no method of ascertaining its character would have achieved very precise results. The life span of the group was a matter of hours only, spread over eight weeks with intervening days of no activity. The group's environment was, on the whole, quite permissive so that no strong efforts were required to meet the problem of group survival. Finally, the possibilities for individual sentiment satisfaction in the group were limited, once the act of joining the group had satisfied the sentiment of wishing to avoid a term paper.

Yet in some sense, the group did have norms. Or at the very least the data indicates that standards of conduct were in the process of emergence. Although there is no way of being sure of the point, it seems likely that the most secure standards of conduct were derived from other group experiences of a somewhat similar nature, i.e., small informal discussion groups. The extent to which such norms were shared would perhaps be a function of the degree to which these students had had other but similar experiences, rather than the degree to which they were reaffirmed by experience in the present group and integrated into *this* group's structure. It is probably significant in this connection that almost no norms were discovered which

specified role behavior for a single member, with the exception of the stereotyped and familiar role of chairman.

Certainly it is true that in most well-organized groups, the norms (as a part of culture) are partly brought into the group from outside experience and partly are a unique product of the history of the particular group. However, it will also be true that the norms internalized in earlier experience will not in the full sense become norms in a new group until inter-communication has established realization among the members that they are in agreement on the relevance of such standards to the immediate group. In the present situation, experience could hardly have proceeded this far, and for the same underlying reasons, norms peculiar to this group alone were only beginning to emerge. If this is a reasonably accurate interpretation of the state of the norms in the group studied, it is perhaps somewhat surprising that hypothesis 1 received as much support as it actually did.

Before leaving this hypothesis it should be stressed that in deriving an ordering of rank from a near-sociometric test based on a single criterion, only one of many possible criteria was used. How would changes in the criterion affect the rank ordering of individuals and the correlation of such rank orders with the group's norms? Suppose, for instance, that members had been asked to rank their fellows in terms of liking and disliking? If this had been done, it seems *likely* that a somewhat different ordering of individuals would have appeared, for it was fairly clear to those who observed the group closely that persons who worked hardest at the job assigned to the group were not in all cases the best liked, most popular individuals. Since the nine norms dealt predominately with the group's task area, it seems *likely* that a lower correlation would have been obtained if a rank order based on personal popularity had been correlated with performance in the norms than was obtained in the present study. This group had a definite job to do, and the value of their reward (the size of the group grade received which applied toward their individual grades in the course) was affected by the performance of the individual members in the task area. Therefore, the criterion of "contribution to carrying out the assigned task of the group" seemed particularly relevant to this situation. If we had been studying a congeniality group, the criterion of liking and disliking would have been a more useful one. But in any case, it should not be overlooked that the members of any group may presumably be ranked in a number of dimensions of the group's life, and that would apply to the present group as well. Furthermore, the way in which individuals are ranked on the basis of one criterion presumably affects and is affected by the way in which they are ranked on other criteria.

One member of the group who is making very effective contributions to the task area may not be ranked on that criterion as highly as he otherwise would, because he is personally disliked by other members. Unfortunately, the data obtained in this project do not permit illustration of this sort of interdependence.

Hypothesis 2 deals with the relationship between social rank and the frequency with which interaction is initiated by and for each member. The first step in testing this hypothesis was to rank the subjects in terms of (a) the frequency with which each member initiated interaction with other members, (b) the number of times that communications were directed to each member and (c) the total of (a) and (b). All three rank orders were based on the mean number of interactions in which the subject was involved, for all sessions at which he was neither absent nor chairman. This was done to make the interaction records of the twelve subjects comparable, since a number of them were absent at one or more sessions, and by agreement in the group the chairmanship was rotated (in alphabetical order) rather than being assigned to one person. Temporary assumption of the chairmanship had the effect of increasing the individual's interaction rate for that session. This would not have been a disturbing factor except that despite rotation one member never did assume the chairman role, and two persons occupied it twice.

At this point the question was whether or not these three rank orders had any relationship to social ranking in the group. One criterion of rank on which the subjects rated each other, already used, was the degree to which each member contributed to carrying out the assigned task of the group. The number of choices received by each individual (on the third occasion this question was put to the group) was made the basis of a ranking of the subjects on this criterion. This rank ordering of the members was then correlated by the rank-difference method with each of the three orders based on the interaction record. The correlation between the third near-sociometric ranking and that based on communications *sent* to other members was .85. For communications *received* it was .91. The ranking based on *total* communications sent and received correlated .92 with the ranking of members in terms of contributions to the assigned task. All rho's were significant at the five percent level.

A closely related criterion of rank was the rating made of the subjects by one of the observers at the final session, in answer to the same question presented to the students, viz., how did the subjects rank in terms of their relative contribution to the assigned group task? The rank difference

correlation coefficient between this observer's rank order and that based on total communications sent and received was .98.

At the last session of the group, subjects were asked to name in order the three persons who came closest to being effective leaders. This provided another criterion of ranking, presumably related to but not identical with contribution to carrying out the group's task. The term "leader" in the minds of the respondents need not connote that fellow members could be ranked only in terms of their effectiveness in doing the job given to the group. The rank order based on this question correlated .83 (significant at the five per-cent level) with that based on the final near-sociometric test.

The last evidence bearing on hypothesis 2 has already been presented in the discussion of hypothesis 1. A wide range was found in the sizes of the rho's summarizing the correlation between rank orders based on performance in some of the group norms and that based on the final near-sociometric test. Of the nine norms investigated, rho's for the five most closely related with the near-sociometric ranking ranged from .78 to .95. Since, as we have already stated, the near-sociometric ranking correlated .92 with that based on total communications sent and received, we may safely assume that rho's for the interaction ranking and the normative ranking would not differ significantly from those just cited.

Evidently, hypothesis 2 cannot be discarded. The data, insofar as they enable adequate testing of the hypothesis for the immediate group are convincing on this point. It can be said with little hesitation that the more frequently a member interacted with other members of the group, the higher his contribution to carrying out the task of the group was likely to be regarded, both by the subjects and by one of the observers, and (with less assurance) the more likely he was to be chosen as a leader and to be regarded as living up to the norms of the group.

Before completing this discussion of hypothesis 2 it may be of interest to report another finding related to it. The group members were also ranked in terms of the number of *persons* for whom they initiated interaction, and who initiated interaction for them (as distinguished from the number of interactions). The rank-difference correlation coefficient between this ranking and that based on the third near-sociometric test was .87, indicating that rank is related to the number of persons with whom a person interacts as well as the volume of interaction.

Hypothesis 2 is seen to be more firmly supported than hypothesis 1. There may be a number of reasons for this, and among them is the possibility that the difference is partly accounted for by a temporal order in the develop-

ment of a new social system. Norms in a new group develop out of interaction between the members, and this is true whether the norms are familiar ones from previous group experience or are uniquely a product of the new group itself. Behavior prescriptions do not become norms until interaction has established their acceptance by the members and confirmed their power to influence the behavior of individual members. In this sense the element of interaction has a certain priority in time over the element of normative behavior, and it is not unreasonable to suspect that clear-cut patterns of interaction, at least of the order of frequency and direction, might emerge earlier than normative patterns.

Given the purposes of this study, and the limitations of time and other resources under which it was conducted, certain weaknesses and difficulties appear in retrospect. While the task assigned the group, the viewing and analysis of films, had the advantage of considerable interest from the subjects' viewpoint, it had the disadvantage of insufficient uniformity. The sharp differences in film content and relevance to the social disorganization course meant that the job of the group actually changed considerably from one session to the next. The written reports that were submitted also indicated that the subjects were at all times somewhat uncertain as to what was expected of them in the reports.

Another difficulty was the short life-span of the group which meant that its structure was still in the process of formation at the end of the sessions. This problem apparently did not hinder the adequate testing of hypothesis 2, but was almost certainly involved in the testing of hypothesis 1. It was too much to expect that a reasonably clear-cut set of norms could have become an integral part of the group's structure in the available time. Where one wishes to assume that such a set of norms is in operation, it would be better to work with a group having a much longer life history.

Certain methodological weaknesses, already mentioned, should also be included in this list of limitations. Considering the frequency with which the concept "norm" is used in current social-psychological literature, it is surprising that so few efforts have been made to invent methods for empirically identifying norms in a fairly systematic fashion as they actually occur in groups. We were far from satisfied with the methods used in the present study, although we suspected that they would have given better results in a more highly organized group. What was done might have been effectively supplemented with individual interviews with subjects. Another promising approach would be the use of a participant observer. In addition to his customary functions, such an observer might test the presence and

strength of certain key norms by violating them occasionally, since it is under such conditions that group norms are most likely to be made explicit.

The crudity of the method used for recording interaction has already been made clear. Several more refined techniques are, of course, available in this area. However, in the present case it is doubtful whether their use would have influenced the test results significantly.

To summarize, this study set out to test two hypotheses, one relating social rank in a small group and performance in the group norms, the other relating social rank and volume of interaction. While hypothesis 1 receives some support from the data, the results are a good deal less conclusive than in the case of hypothesis 2 where variation in rank based on certain criteria is closely associated with frequency of interaction. As stated, it is somewhat difficult to interpret the findings relative to hypothesis 1 because they were presumably affected to an unknown degree by the methods used and by the fact that the group was new and relatively unstructured.

Before closing this report, the context from which the hypotheses tested here were drawn should be re-emphasized, especially since little attention has been given here to the theoretical implications of the research done. The hypotheses should properly be thought of, not as small fragments of what should some day, as work in this field progresses, become a general theory of small group behavior stated in terms readily amenable to empirical testing. They are two instances of what in a fully developed theory would be a large system of interlocking statements about small group behavior. The extent to which any one hypothesis would apply in a given group would, of course, be affected by the presence of other factors not specifically recognized in the single hypothesis, but ultimately accounted for in the other related hypotheses.

The findings reported here will not strike anyone as being new or startling. If they make any contribution at all to the field it is that they state relationships grasped intuitively, or in a conceptually ambiguous fashion, in empirically usable conceptual terms, so that their inter-connections with other analytical statements about small group behavior can be made explicit and clear. We already have a good deal of knowledge in one sense or another about small group behavior, but it is likely that we are at a stage of development where what we know needs to be synthesized and re-examined within a reasonably integrated conceptual framework as a platform and guide for the research work which lies ahead.

THE LOGIC OF SOCIO-ECONOMIC STATUS SCALES*

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One of the principal "short-cut" techniques used in stratification studies is the "socio-economic status" scale in its variant forms. These scales have developed not only as a result of the demands of the research sociologists, but also of the specialists in educational psychology, interested in studying the role of "home background" in children's lives, and the social workers who face such practical problems as child placement. An examination of the logic and "rationale" of this stratification technique is in order.

The construction of standardized multiple-factor scales or indices of "socio-economic status," or some similarly defined stratification variable, follows a rather definite pattern, although there are individual variations.[1] Basically, there are eight steps involved in the process:

(1) Socio-economic status is defined, and its respective sub-areas are indicated.

(2) A number of test items, or questions, are devised which are presumed to be connected with relative vertical position in each of these sub-areas. These items may be scored as either "present" or "non-present," or may be graded along a continuum.

(3) These test items are tried out and scored on a sample of respondents, representing a cross-section with regard to some objective factor commonly regarded to be associated with "socio-economic status" (for instance, income or occupation).

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[1] For a good review of the historical development of these scales and their techniques of construction, see Wililam H. Sewell, *The Construction and Standardization of a Scale for the Measurement of the Socio-Economic Status of Oklahoma Farm Families*, Oklahoma Agricultural and Mechanical College Agricultural Experiment Station, Technical Bulletin No. 9, 1940. See also, for construction techniques, George A. Lundberg, *Social Research*, New York, Longmans, Green and Co., 1942, pp. 288-309.

For a valuable critique of the scales to which we are heavily indebted, see Genevieve Knupfer, *Indices of Socio-Economic Status:* A Study of Some Problems of Measurement, Published by the Author, 355 E. 50th Street, New York 22, N. Y., 1946; also, Knupfer and Robert K. Merton, "Discussion of Lundberg-Friedman Paper," *Rural Sociology*, Vol. 8, No. 3 (Sept., 1943), pp. 236-39.

(4) Items are validated, or selected. That is, a selection of items from the original scale is made on the basis of statistical techniques which relate the items either to some external criterion, or to an internal criterion (the test itself). The general goal is to obtain those items which show the greatest capacity to discriminate levels of socio-economic status.

(5) Weights for the items are derived by statistical techniques. Here, again, the choice of techniques depends on whether an external or an internal criterion is being used.

(6) The reliability of the scale—that is, its ability to measure consistently that which it is designed to measure—is determined by certain standard techniques (test-retest, split-half correlation, etc.).

(7) The validity of the scale—that is, proof that it really is measuring what it is designed to measure—is sought. The common procedure here is to correlate the results of the test with those obtained on the same group by some other "socio-economic status" scale, or with occupational or economic divisions.

(8) Norms, or group divisions, along the numerical status continuum may be established. This is an optional procedure, and is sometimes performed arbitrarily, sometimes by examining the relationship of test scores to divisions along some external criterion of status.

It should be apparent that No. 1 of the steps outlined, the definition of socio-economic status, is of crucial importance, for it determines specific procedures in nearly all of the subsequent steps, and ultimately is the foundation on which the logic of the scale must rest. Essentially, there are two theoretically possible situations with regard to such a definition:

(A) Socio-economic status is a *known and demonstrable attribute,* in which case a sample of individuals or families representing different degrees of this attribute can initially be secured, and the subsequent steps in the construction of the scale or index, i.e., selection and weighting of test items, etc., are based on the degree of ability of the items to distinguish the respondents possessing various degrees of this known variable. Needless to say the test population on which the items are originally administered is then the sample group, the "socio-economic statuses" of whose members are already known, and validation then becomes simply a matter of determining whether the final test items predict these various positions with a reasonable degree of accuracy.

(B) Socio-economic status is an *unknown but presumptive attribute,* X, in which case, the test population is stratified with regard to some variable *presumed* to be highly correlated with X (such as income, or occupation),

and the selection and weighting of items is then usually based on the capacity of the items to distinguish various levels of scores on *the test itself,* which procedure is further predicated on the assumption that the test scores are highly correlated with X. Validity is then gauged by determining the ability of the final form of the test to distinguish various occupational or income levels, or by its correlation with other indices of "socio-economic status" whose construction has been based on a similar series of assumptions. Since ultimate validation of *all* the indices, pending the isolation or discovery of X, eventually depends on their ability to distinguish groups differentiated by some external criterion, such as income or occupation, one might well ask why these more easily obtained criteria are not used in the first place, without bothering to construct an index. The only logical answer must be that these external criteria are highly but only imperfectly correlated with X. In reply to this, then, it must be pointed out that since the relative merits of the index and the external criterion as predictors of X are undetermined, the simpler, external criterion may be just as useful. A possible last resort answer of the Type B index maker might be that X, or "socio-economic status" is a construct consisting of a combination of positions in the areas which the test differentiates—in other words, X is simply what the test measures. In such a case, however, validation against some external criterion is obviously superfluous.

The balance of this discussion will be concerned with definitions and procedures used in the perhaps four best known of the socio-economic scales in the sociological literature: the Chapin,[2] the Sims,[3] the Leahy,[4] and the Sewell,[5] and also the recently advanced index of Warner and associates.[6]

Chapin has offered the classic definition of socio-economic status: "Socio-economic status is the position that an individual or a family occupies with

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[2] F. Stuart Chapin "A Quantitative Scale for Rating the Home and Social Environment of Middle Class Families in an Urban Community," *Journal of Educational Psychology,* Vol. XIX, No. 2 (Feb., 1928) pp. 99-111; *The Measurement of Social Status by the Use of the Social Status Scale,* Minneapolis, University of Minnesota Press, 1933; also Chap. XIX of *Contemporary American Institutions,* New York and London, Harper and Brothers, 1935.

[3] Verner Martin Sims, *The Measurement of Socio-Economic Status,* Bloomington, Ill., Public School Publishing Co., 1928.

[4] Alice M. Leahy, *The Measurement of Urban Home Environment,* Minneapolis, University of Minnesota Press, 1936.

[5] *Op. cit.*

[6] W. Lloyd Warner, Marchia Meeker, and Kenneth Eells, *Social Class in America,* Chicago, Ill. Science Research Associates, 1949.

reference to the prevailing average standards of cultural possessions, effective income, material possessions and participation in group activity of the community."[7] These four elements, then—cultural possessions, effective income, material possessions, and social participation—are, in his own words, "assumed to constitute socio-economic status." But, as Knupfer has pointed out, "This is not a definition, but an enumeration of categories of things which are assumed to be related to socio-economic status."[8] And Chapin, in a later revision of the scale (this time referring to it as a "social status" scale) corroborates this remark by admitting that "we *judge* [our italics] the social status of a person," and refers to "our opinion of a person's social status."[9] In other words, socio-economic, or social status refers to a set of attitudes to which the four enumerated areas are assumed to be related. The exact relation of these four areas to the attitudes is unknown and never discovered, so that as far as the construction of the scale is concerned, it follows the procedures outlined for Type B in our discussion. Items are selected which indicate degrees of cultural possessions, effective income, social participation in the community, and material possessions. "On further analysis, the totals of the weights given to living-room equipment were found to correlate so highly with the combined weights of the four indices that the equipment of the living room could be taken as a fair index of socio-economic status."[10]

Thus the logical formula of the Chapin scale reads as follows: Socio-economic or social status (a set of attitudes) is assumed to be measured by four areas (see above); these four areas are adequately measured by the equipment of the living room; therefore the living room scale measures socio-economic status. Nowhere in this process, however, has the question of the crucial attitudes (socio-economic status) been empirically investigated, for the test population is only occupationally analyzed, and validation is offered only by correlating the results of various versions of the scale with results of other scales or with occupational or income groups (for instance, "professional men's homes," "poor relief cases"). Thus, in the words of Knupfer, "Even if we assume that we know what is meant by status-conferring attitudes, we find in this scale construction a significant hiatus. The most important step of all is lightly by-passed by means of an arbitrary assump-

[7] "A Quantitative Scale for Rating the Home and Social Environment of Middle Class Families in An Urban Community," p. 99.

[8] *Op. cit.*, p. 19.

[9] Chapter XIX, *Contemporary American Institutions*, p. 373.

[10] *Ibid.*, pp. 374-75.

tion: the relation between status (as attitudes) and the enumerated categories (possessions, participation) is never tested."[11]

The Sims scale, or "score card," consists of a series of questions administered to school children, which is designed to indicate the "socio-economic status" or "certain aspects of the home background" of the pupil's family. The questions deal with such areas as the occupation and education of the parents, the possessions of books and magazines, physical necessities and luxuries in the home, and outside contacts of the parents and children. Sims' discussion of what the test measures is of interest here:

> It is felt that the possession of the items asked for in the question is indicative of some more general possession which has been called the *socio-economic status* of the family. If pressed as to what is meant by "socio-economic status," one is compelled to answer that it is whatever this instrument measures. This, however, is a useless subterfuge. The need for some label which is generally interpretable is urgent. By socio-economic status is meant nothing more than the possession or non-possession of traits such as those above mentioned. If these traits are present, presumably the child has, both from the cultural and economic standpoint, a more favorable environment than he would have if these characteristics were absent. Furthermore, it is reasonable to suppose that the more characteristics existing, the more favorable the environment.[12]

Thus Sims seems to waver between two interpretations of socio-economic status: either it is X, a "general possession," or unknown, of which the various areas are indicative, or it is precisely the combined standings in the areas or items, which combination of traits represents the degree of "favorable environment" for the cild—favorable for what is not explicitly stated—but presumably for success in scholastic, or later occupational achievement. Here, again, however, an empirical demonstration of the relationship between the test areas and the defining criterion—predisposition of the environment for scholastic achievement—is missing. Moreover, in the selection of the test population for item validation, and of populations for final scale validation, the specific environmental areas are not mentioned, but rather ratings are secured of pupils from schools which represent "the best homes," the "average homes," "the poorest homes," etc., and occupational groups—"professional group," "unskilled labor group"—are used. The test population, for instance, is secured by asking the superintendent of schools in the community to grade the elementary schools into "social levels." Sims thus

[11] *Op. cit.*, p. 23.
[12] *Op. cit.*, p. 5.

seems implicitly to be groping towards an interpretation of socio-economic status as social status levels, although this position is never explicitly taken, and is further obscured by his unproven equation of "socio-economic status" with "favorable environment," his selection of test items on the basis of internal test criteria rather than status group placement, and by his use, in part, of occupational groups for scale validation.

The Minnesota Home Status Index constructed by Leahy, like the Sewell scale, is characterized by the use of highly sophisticated statistical techniques in the selection and weighting of items, but is perhaps even vaguer than the scales discussed thus far, in specifying just what it is that it is measuring. We are told that, "The purpose of this study is to construct a scale that will give numerical expression to the nature and extent of variation existing in living conditions in urban homes." Furthermore, "Since a measure of environment is used primarily in connection with research concerning children and with social service involving the placement of children, it is important to include all these aspects of home and community life that may impinge directly or indirectly on the behavior and development of the child."[13] But what behavior and what kind of development are only incidentally specified? Again we must extrapolate and assume that the environmental conditions in mind are those which are related to scholastic or eventual occupational achievement; and, again, the relationship of the test areas—Children's Facilities, Economic Status, Cultural Status, Sociality, Occupational Status, and Educational Status—to such achievement is assumed rather than demonstrated.

The items themselves are questions or objective observations filled in in by the investigator in a home interview. In accordance with "Type B" procedure, the test population of 600 families is selected to give an occupational cross-section of the community, the selection and weighting of items is based on the relationship of the items to the test itself, and validation of the test is secured by correlation with scores obtained on a sample of the test group with the Sims Score Card, and by testing the ability of the scale to differentiate two occupational groups, "professional men" and "day laborers." In other words, "Home Status" is only vaguely defined; in the event that it is meant to indicate degree of favorable environment for scholastic achievement, such a relationship is perhaps presumptive but undemonstrated; the construction of the scale is based on the assumption that the combination of items *is* "home status," without further explanation or defini-

[13] *Op. cit.*, pp. 10 and 11.

tion; and the validation procedure is concerned only with another scale and with occupational groups.

Sewell's carefully constructed scale is designed to measure the "socio-economic status" of Oklahoma farm families. It is offered as the first standardized scale in the rural field, although the constructor cautions that restandardization procedures should be used if the scale is to be administered to rural population groups in other areas. Regarding the question of what socio-economic status is, however, Sewell accepts without question the definition of Chapin, adding the following comment: "Socio-economic status is thus considered as a complex pattern, made up of inter-related parts, which functions as a unit in evoking a response. In other words, this definition hypothecates [sic] that these parts work together consistently to determine the status level of the family or individual."[14] This does give us the concept of socio-economic status as a "status level" which "evokes a response," but the ramifications of this are not explored, the relationship of status level to the four areas in Chapin's definition is not demonstrated, and the concept plays no empirical part in the selection of the test population or the validation procedure.

Accordingly, a series of items are selected which fall into the familiar four categories of Cultural Possessions, Effective Income, Material Possessions, and Participation in the group activities of the community. The test population consists of 800 Oklahoma farm families representing a cross-section of tenure status types and economic planes of living. Item selection and weighting are based on the test itself rather than on any external criterion, and validation is gauged by correlating the results of the scale with those given by other socio-economic status scales on the same population, by correlating with certain economic variables, and by the securing of significantly different mean scores for owners, tenants, and laborers. Thus "Type B" procedure is consistently followed, and socio-economic status is either an unknown X or "what the test measures."

It should be obvious from the preceding discussion that until the concept of socio-economic status is clearly defined, the construction and validation of scales designed to measure it must be based on theoretical inadequacies. Perhaps the key difficulty is illustrated by the nature of the descriptive term itself—*socio-economic status*—a term which combines at once two elements of stratification, social and economic, in the unproven assumption either that they act as a unit as a stimulus for evoking responses, or that they

[14] *Op. cit.*, p. 20.

are perfectly correlated with one another. Several writers have recently emphasized the need for isolating stratification continua, considering them separately, and studying their co-variation empirically.[15] This analytical framework applies with equal force to the concept of socio-economic status. One continuum of stratification is social—that is, the evaluation of prestige position in the community; another continuum is economic power—as measured by wealth or income; another is political or community power, in terms of ability to make decisions enforceable on other members of the community; another might be "cultural" quality of home, in terms of subjective standards agreed on by educators; and so on. If the data for the particular continuum is easily obtainable, there is no need for a scale or index. If not, an index may be in order as a time-saving device for future researchers. But the framers of a scale must choose which of the stratification components they wish to measure. To lump them all together is justifiable neither on any theoretical basis, nor on the basis of available research evidence from recent community studies, which indicates precisely that these stratification components do *not* vary perfectly with one another. At any rate, in the words of Knupfer, "the unity of status should ultimately be decided empirically."[16] Since there is little likelihood that this unity *can* be demonstrated, socio-economic scales based on "buckshot" definitions must continue to wallow in the haze of theoretical uncertainty which so obviously surrounds them. The roughly empirical usefulness of the scales, it should be noted, is not here being questioned. Since there probably are (on the basis of existing correlation studies of prestige, occupation, income, etc.) correlations of .5 and above among stratification components, the scales undoubtedly serve as rough measures of position on any one of the standard stratification elements.[17]

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[15] Milton M. Gordon, "Social Class in American Sociology," *The American Journal of Sociology,* Vol. LV, No. 3, pp. 262-68.

Arthur Kornhauser, "Public Opinion and Social Class," *The American Journal of Sociology,* Vol. LV, No. 4, pp. 333-45.

[16] *Op. cit.,* p. 28. This point is also well made in Knupfer-Merton, *loc. cit.,* and by Jane Loevinger, "Intelligence as Related to Socio-Economic Factors," The Thirty-Ninth Yearbook of the National Society for the Study of Education. *Intelligence: Its Nature and Future: Part I, Comparative and Critical Exposition,* Bloomington, Ill., Public School Publishing Co., 1940, pp. 159-210.

[17] Lazarsfeld has demonstrated the interchangeability of rough economic indices for obtaining approximately similar distributions of some attitude or behavior variable. (See P. F. Lazarsfeld, "Interchangeability of Indices in the Measurement of Economic Influences," *Journal of Applied Psychology,* Vol XXIII, 1939, pp. 33-45). But this raises the interesting question of whether the distribution of the *same people,* or merely of

But this is far from theoretical justification of their scientific adequacy and does not obviate the necessity for scale construction which is carefully based on that particular element of stratification pertinent to the problem at hand.

If recourse is had to the position that socio-economic status is simply "what the scale measures" then the implications of this position must be faced. Briefly, these are that (1) the scale measures (granted, for the moment, the adequacy of its items) an artificial construct consisting of relative positions in several discrete areas.[18] This raises the question of what the usefulness of the construct is for the researcher's problem: (2) validation of the scale against anything except itself is illogical; and (3) no two scales measure exactly the same thing, unless they use exactly the same items. These implications have not been recognized by the defenders of the scales, and one is not sure that they would be happy with them. Lundberg, for instance, in a vigorous defense of the "operationalist" position, declares that "the statement that socio-economic status *is* what a scale for measuring socio-economic status measures, has therefore the same validity as to say that the conditions and the behaviors which any group calls high socio-economic status *is* high socio-economic status for that group."[19] But if it is group judgments which constitute socio-economic status, then the initial step in scale construction is to obtain these group judgments, distribute the community members accordingly, and then construct and validate the scale on the basis of this empirically established status distribution.

As far as this writer can determine, the first index to meet substantially the problems suggested in the foregoing critique is the recent Index of Status Characteristics offered by Warner and associates.[20] Briefly, there is a clear definition of what the index is designed to measure, the test population is initially stratified precisely on the basis of this definition, the selection and weighting of items is related to their predictive ability for the defined variable, and validation is measured simply by the final scale's prediction of the stratification of the original test population.

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the *same percentages,* is being obtained. Different ramifications follow from these respective alternatives.

[18] If factor analysis discloses the substantial presence of a common factor in some of the scales, this does not tell us what the factor is, nor assure us that the common factor of one scale is the same as the common factor of another scale. At any rate, the discreteness of the areas remains. The problem simply becomes one of discovering what the common factor is, and how the respective areas are correlated with it.

[19] George A. Lundberg, "The Measurement of Socio-Economic Status," *American Sociological Review,* Vol. 5, No. 1 (Feb., 1940), p. 36.

[20] *Social Class in America, passim.*

The Warner Index of Status Characteristics (I.S.C.) is designed to measure position in the segmentalized prestige, or status hierarchy of a community. By means of a series of direct and indirect status ratings obtained from members of the community (the Evaluated Participation (E.P.) method), 303 families in a small mid-Western city were distributed into a hierarchy of five status groups. On the basis of preliminary inspection of factors associated with status group variation, six factors—occupation, amount of income, source of income, education, house type, and dwelling area—were selected, and each one was made the basis for a 7-point scale. The first form of the Index consisted of a simple arithmetic average of the six ratings (high status=low score). The scale was then administered to the test population. It was found that the total scale gave better prediction of status group placement than any one of the items separately. By means of simple and multiple correlation techniques, the most efficient (statistically, and practically, with minimum loss of predictive ability) combination of characteristics for prediction were found to be occupation, source of income, house type, and dwelling area. Optimum weights for these 4 ratings were determined by means of a regression equation. Norms, or optimum dividing points on the numerical continuum for status group division, were similarly obtained by means of the regression equation technique. Thus the final scale is constructed on the basis of its ability to produce optimum predictability of status group, or "social class" participation. Validation then becomes simply a question of how efficiently it does this for the test population, for whom the status group placement (E.P.) is known. Comparing the E.P. rating with the I.S.C. rating for this group, it is discovered that I.S.C. predicts correct E.P., or status group membership in 84% of the cases. The series of steps just outlined, it will be noted, corresponds to Procedure A as described in the introductory pages of this paper.

There are a number of problems which remain, of course, even for the Warner Index. It is predicated on the accuracy and validity of the discernment of a five-fold status group hierarchy in the community studied, and the correct placement of the 303 families in the test population. Greater than 84% accuracy could be sought. Some of the ratings, as, for instance, "house type," involve a considerable and perhaps inevitable amount of subjective judgment. The rating of members of ethnic groups is a problem which has been solved statistically, but not conceptually. The application and validity of the scale, and the estimation of appropriate norms for other communities in other areas and of different sizes is a matter for empirical investigation. It does not deal with rural areas. The meaning of different

numerical totals within each status group range needs explanation and clarification (degree of predictability is the Warner answer). It is regrettable, too, that Warner uses without criticism the conventional term "socio-economic status," and offers as an alternative usage to status group placement, the determination of socio-economic status "in numerical form" as a function of the scale. In spite of these qualifications, however, the Warner scale, of all those yet devised, seems best to meet the criteria of clear definition, selection of one stratification variable, and construction and validation of the scale on the basis of a test population stratified by the defining quality which the scale is designed to measure. Future constructors of stratification scales would do well to consider the logic of these criteria.

It is interesting, finally, to examine the relationship of what have come to be known as sociometric techniques[21] to the problems of social status and economic measurement. The Moreno tests, in their specific defined sense, usually focus on the discovery of patterns of attraction and repulsion among individuals in a particular group as revealed by associational choices on the part of the persons tested. The type of status measured by these tests is to be distinguished on at least two counts from social status conceived as a stratification variable oriented to the entire community: 1) the "sociometric status" is related to the specific group being tested rather than the general community at large; 2) sociometric status reflects actual attraction patterns in terms of what respondents would *wish* to do, whereas generalized social status is a function of social-psychological attitudes of superiority and inferiority which have conditioned people to make friends realistically from status levels close to their own (and thus also of common interests). To put it another way, generalized social status is likely to be more closely related to *reciprocated* and *already effected* friendship patterns, whereas sociometric status will more probably reflect attraction patterns *whether or not they have been reciprocated or effected.* Nevertheless, once these distinctions are realized, it is of considerable value to knew just how these two types of status are empirically related. To what extent, in other words, is sociometric status in a particular group dependent on the generalized social status (or, for other purposes, the economic position) of the persons being tested.[22]

[21] For the classic statement of these techniques, see J. L. Moreno, *Who Shall Survive?,* New York, Beacon House Inc., 1934, revised edition, 1952.

[22] See, for one study dealing with this problem, George A. Lundberg and Mary Steele, "Social Attraction Patterns in a Village," SOCIOMETRY, Vol. I, Nos. 3 and 4 (Jan.-April, 1938) 375-419. They use, however, a socio-economic status scale (the Chapin) for this correlation which is subject to the criticism made above.

The accumulation of a body of research into the nature of this relationship would add much to an understanding of both the attraction-repulsion patterns within social groups and the dynamics of generalized social status. One hypothesis might be that an increase in age of respondent makes for greater coincidence of sociometric choices with like social status.[23] An empirically derived curve showing the growth of such a relationship would provide a valuable developmental picture of the internalization of social status attitudes prevalent in the culture.

[23] This hypothesis has been frequently stated and empirically demonstrated, more recently in J. L. Moreno's "Sociometry Experimental Method and The Science of Society," p. 127-133, Beacon House, 1951. The study of the relationship between Sociometric Status and Generalized Social Status has been since its beginnings one of the foci of sociometric research. (*Ed.*)

THE SOCIOMETRIES OF DR. MORENO*

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I

Most readers of *Sociometry* are aware of Dr. Moreno's practice of giving his books intriguing titles. *Who Shall Survive?* (1934) was a book filled with the results of experiment and research. *Sociometry, Experimental Method and the Science of Society*—a title suggesting a book focused on research and methodology—is most notable because it brings together essentially theoretical, philosophical and didactic ideas. It is a collection of writings which are a part of Dr. Moreno's continuing "war of persuasion" to convince everyone of the basic validity of sociometry and the imperative necessity for its application to benefit mankind. The breadth of the book, if not its content, is suggested by the sub-title: "An approach to a new political orientation."

All but six of the 31 selected articles, papers and speeches collected in this volume have been previously published. Most of them appeared in *Sociometry,* but some were written before this journal was founded. The selections are grouped into five sections, whose titles are: "Sociometry and the experimental method," "Group formation and social dynamics," "Political sociometry," "Military sociometry," and "Sociometry and microsociology." In assembling a portion of his writings in a single book Dr. Moreno faced the problem of organizing and arranging ideas originally presented in widely different contexts over a long period of time. In a sense, he has violated his own principle of *status nascendi* by offering some of his selections so far from their places of birth that they lose a part of their original pertinence. The book, therefore, has more the character of an anthology than of a systematic treatise on the subject of sociometry.

Most of the selections in this book were written during sociometry's crusading period when, to quote the foreword of Dr. Gardner Murphy, "the Moreno approach bludgeoned its way into even the drowsiest library and classroom, and compelled attention." But the book will be read today when the "vitalizing force" of Dr. Moreno's work has wide recognition. In this present period, the critics of sociometry must deal with its theoretical power and the thrust of its research, not with its claims to originality, precedence

* The occasion of this article is the publication of J. L. Moreno, *Sociometry, Experimental Method and the Science of Society,* Beacon House, Inc., Beacon, N. Y., 1951.

and uniqueness. From this viewpoint, the arguments over who originated ideas, who contributed most, who should be given credit, have only a partisan, though important, documentary value to the historian of social science. It is hoped that, in future books, such discussions will be separated from the more fundamental issues without minimizing the clarification which may come from Dr. Moreno's comparison of the ideas of others with his own.

This book will disappoint those who look to it for the long-needed systematic statement of approach, theory and methodology which Dr. Moreno calls sociometry.[1] But it will provide its readers with the best available compilation of the sort of provocative ideas and hypotheses which are always associated with Moreno's writings and speeches. It is not an easy introduction to sociometry. However, for those who are already working in the field, its most immediate effect should be to remind them that sociometry is more than the special research techniques which so many identify as its chief meaning.

What emerges from a reading of the various selections in this book—ranging from autobiography, speculation and argument, on the one hand, to definitions, statements of theory, research reporting and criticism, on the other—is a view of what sociometry is to Dr. Moreno. Like other new approaches, sociometry cannot be confined to the ideas of its creator. Having launched sociometry into the world, even Dr. Moreno cannot control the meanings it will have to many people. This is one indication of the stimulation sociometry affords. But with sociometry, as with other creative ideas, there has been a strong tendency for specialization among followers and disciples, attracted to some special aspect. This latest book forces us to remember that Dr. Moreno's sociometry must be understood on at least three interrelated levels: as an orientation toward life, as a theory of society, and as a method of research. Dr. Moreno himself does not always make clear which of these aspects he is dealing with, undoubtedly because they are so completely integrated in his own wholistic viewpoint. It may be a useful guide to this book, however, to set forth briefly what seem to be the central ideas in these three sociometries of Dr. Moreno.

II

The full import of the writings in this book cannot be grasped unless one keeps in mind the fact that sociometry is a philosophy of living, springing from a profound belief in the spontaneous and creative in human beings and a desire to release such forces from the fetters of institutions and culture.

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[1] I am informed that such a statement is promised in the revised edition of *Who Shall Survive?*, now in press.

The key idea in this orientation is spontaneity, an idea never made entirely explicit. It implies naturalness in the sense of activity which a person *really* wants to do, expressive of his *complete* self, unencumbered by social rules and restraints. It implies expressive creativity in the sense of a positive release of interactive energies. Spontaneity is revealed by vitality of action in a situation.[2] Dr. Moreno seems to believe that if human beings can recognize their genuinely spontaneous relationships and the social structures built upon them, they may reconstruct human society in the interests of a more satisfactory social world (139).[3] Two basic maladjustments seem to have set the problem for sociometry when it emerged: the destructiveness of technology to man's society (138) and the loss of God in man's theology (201, 204). It was the tumbling world of God and custom in the first quarter of the twentieth century to which Moreno sought orientation. He found it in the conviction that one may discover "the patterns of social structures which *actually exist* in human society," (139) and simultaneously release the natural spontaneity which will permit the shaping of social life more nearly in accordance with man's highest ideals. Upon these real, true and basic patterns the "major experiment in sociometry" (139) can ultimately be conducted. This experiment is action, reconstruction and research in one, and it might result in a world-wide reorganization of human relationships and institutions (139).

The sociometric orientation is an active attack on human problems. Moreno has no more patience with "spectator-philosophers" (119) than with "spectator-sociologists" (42). "The new philosophy of human interrelations, sociometry, gives us a methodology and guide for the determination of the central structure of society and the evocation of the spontaneity of the subject-agents, and these two factors together supply us with a basis upon which the planning of human society may be undertaken" (137).

Social reconstruction depends on the involvement of all the people. "Sociometry opened up a new possibility of genuine planning of human society for the reason that the factors of spontaneity, the initiative and the momentary grasp of the individuals concerned were made the essence of the method of exploration and of the investigation itself" (137). The task of sociometry and of sociometric techniques and research is to "arouse the

[2] "Spontaneity is the variable degree of satisfactory response an individual manifests in a situation of a variable degree of novelty." J. L. Moreno, *Sociometry, Experimental Method and the Science of Society* (1951) p. 38. It is distinguished from, but interwoven with, "creativity", cf. ibid. pp. 217-218.

[3] For convenience, page numbers of the book under review are inserted in the text.

individuals to the required point . . . (where they will) be adequately motivated so that they summon from the depths of their beings the maximum of their spontaneity" (136). Only in this way will man be able to outwit the products of his own brain—the "cultural conserves"—and tune his society to himself.

Because of this belief in the central place of spontaneity in genuine human relations, Moreno makes no distinction between a philosophy of society, social research, and social action. His approach is not, however, manipulative. Society can only be understood when one is a spontaneous part of it; the social researcher is an "action agent," (134) he is a co-actor, a co-subject, a co-scientist with all others in the sociometric experiment (134). Hence, the sociometric orientation to life is one of sensitivity to the deeper, less obvious in people. It emphasizes the "warming-up process" by which all—the researcher, the philosopher, the revolutionist—come into intimate, interactive contact with one another, attuned to the spontaneous and the creative in each and all.

This orientation—the grandest version of Dr. Moreno's sociometry—leads to a basic respect for the person, a response to the quieter sufferings and joys of the human being, a passionate desire to release the creative in all men. "The sociometric experiment aims to change the old social order into a new social order. It is designed to rebuild the groups, if necessary, so that the official surface structure is as near as possible to the depth structure" (37). It is Moreno's deepest faith, his "God-universe pattern," the "ontological guide" after which he modelled sociometry, that in such a way a society may be created in which our deepest selves are realized (202).

This conception of sociometry is not confined to a single section of this most recent book by Dr. Moreno. It may be found most clearly expressed in several separate articles.[4] But this larger view is likely to crop up at any point, whether the discussion is of philosophy, research design, or applied problems. Unless it is recognized as the broader concept of sociometry, the reader may be confused in these places. It is well to keep in mind, therefore, that Dr. Moreno is always aware of the larger problems for which this level of sociometry is his approach. "The great problem which the western civilization in the twentieth century faces is that after having driven people out from the protective walls of strong and cohesive religious systems, it is anxious to

[4] "Sociometry and the experimental method", p. 29 ff., especially pp. 35-37; "Foundations of sociometry", p. 135 ff., especially pp. 135-141; and "Origins and foundations of interpersonal theory, sociometry and microsociology, p. 201 ff.

replace them by strong and cohesive secular systems—with the aid of science" (218). Moreno never entirely loses sight of this problem. Its solution is his ultimate purpose. Indeed, the book concludes with the conviction that: "With the cooperation of 'all' the people we should be able to create a social order worthy of the highest aspirations of all times. This, and this alone, is the meaning of revolutionary, dynamic sociometry" (219).

The second sociometry of Dr. Moreno is a theory of society. Although he takes pains to distinguish sociometry from sociology, social psychology and social anthropology, the central problems of the behavior sciences are the central problems of sociometry. Sociometry is for Dr. Moreno a conception of the nature of society and of a systematic way of uncovering its fundamental features and the dynamic principles of its operation. Again the basic premise seems to be the belief that human nature is spontaneous and creative, expressing itself socially through the process of *tele*, feelings and meanings inter-directed between persons which, in the broadest sense, may be interpreted as attractions and repulsions. *Tele* is the cement which holds social structure together. Moreno considers *tele* not a theoretical concept, but a fact based on the statistical observation that individuals are not randomly interrelated but exhibit definite directions of attraction and repulsion towards one another (144). He suggests that there may be a socio-physiological basis for *tele* (8-9), or that it may have some relation to gene structure and sexual attraction (144).

On the basis of this process, social atoms and psychological networks emerge. These, too, for Moreno, are not concepts but descriptive facts, "just as in anatomy the blood vessel system, for instance, is first a descriptive fact" (22). Their conceptual significance lies in the recognition of the functions they perform in the formation and structuring of human society. Social atoms consist of the configuration of attracted and repelled persons and objects around any given individual. The inter-linkings of social atoms produce psychological networks. These may be descriptively discovered by charting the "psychological geography" of a given community.

These spontaneous expressions of *tele* are the basic structures of society—"primary social structure" (214). They are the "foundations of human society" . . . "the patterns of relationships which human beings form with one another and which persist underground, regardless of what religious, social, political and technological structure is superimposed upon them and rules on the surface" (138). This primary level is revealed through sociometric, action-based procedures, sociological and psychological cartography, psychodramatic and sociodramatic techniques, etc.

Although the sociometric structures are primary, they are not considered by Moreno as any more "real" than are the secondary structures built upon them. The "sociometric matrix" is distinguished from the "external society," and the "dynamic synthesis and interpenetration" of these levels is "the social reality" (127). The external society—visible in the more formal groupings and institutional patterns—is not necessarily concordant with the sociometric matrix but neither are they necessarily at odds. Their relationship is a question which only investigation can answer. But the theme of maladjustment between these levels runs through Moreno's sociometry. The dynamics of "social reality" arise from a dialectic of adjustment between these levels. The primacy of the sociometric level rests on the fact that it more nearly expresses the spontaneous factor in human nature. For this same reason it is strongly implied that the emergent social reality strives toward the sociometric structure. The hypothesis is offered that "social conflict and tension increases in direct proportion to the socio-dynamic difference between official society and sociometric matrix" (129). The resolution of these differences is not, however, a static balance because both the spontaneous and the creative in human interaction are a continuous source of new sociometric relationships. But in this dialectic lies the possibility of social stability and of directed social change.

This sketch of major features of Dr. Moreno's conception of society cannot begin to do justice to the rich, suggestive by-paths of his theory. One will find in this book the beginnings of many penetrating analyses of sociological problems. The discussion of ageing and death, beginning with the conception of the social atom, not the individual, as the smallest social unit, is a brilliant and striking example (65-69). Unfortunately, this and other equally provocative applications of sociometric theory to the analysis of social relationships appear as fragments. Sometimes Dr. Moreno asserts that much research has produced the conclusions he reports; sometimes he says that the approach he is discussing is a basis for research in progress. I, for one, would not ask Dr. Moreno to wait for the complete formulation of his system of sociology, nor the conclusion of his research studies, before presenting such provocative fragments, but I would hope for an early presentation of both. Meanwhile, the imaginative directions in which Moreno has pointed should be followed by the research and theory of other social scientists.

The third sociometry of Dr. Moreno is the one most often recognized in the social science fraternity—sociometry as a method of research. But this recognition is given far more to the ingenious techniques identified with sociometry than to the methodological principles which are an integral part

of Moreno's general philosophy and his conception of society. Sociograms, action and role playing tests, and other techniques are widely used in research and their elaboration is producing a significant and useful literature for the research technician.[5] But the ingenuity of the techniques is often mistaken for the substance of sociometric method. The discussion of method in this present book has to do with its substance, not with techniques. The book should call researchers back to a broader conception of sociometry than they often exhibit in their writings.

The heart of Dr. Moreno's sociometric method is *action.* Time and again in the writings of this book and elsewhere, he insists that sociometric methods require that individuals cease to be subjects for research, patients in the clinic, or objects of reform. They must become participants (20). Whether the objective is therapy, revolution of scientific research, the method is "near-sociometric" or "pseudo-sociometric" or simply "non-scientific" until the individuals are aroused "to a maximum of spontaneous participation and to a maximum of expression" (19). Indeed, "the complete sociometric procedure" combines research, diagnostic, therapeutic and political procedures into a single process (21).

Dr. Moreno is not unaware of the difficulties of this conception of sociometric method. It runs counter to conventional concepts of scientific method by deliberately denying the separation of researcher and subject. But he warns more strongly against the artificiality which results when responses of subjects are confused with meaningful behavior. Meaningful behavior for Moreno is, once again, that behavior which is most spontaneous in the immediate situation. "The subjects must be approached," he writes (115), "in the midst of an actual life-situation and not before or after it." They must be "truly themselves" in a "spontaneity state" to be understood. The methodological task of the social scientist is to invent instruments which are able to arouse individuals to the point where they "summon from the depths of their beings the maximum of their spontaneity" (136). This action-response may even be denied by the subject himself but it is "the deepest, present expression of his spontaneity" (123).

Moreno insists that techniques such as the sociometric test, the sociogram, spontaneity test, psychodrama, sociodrama, group psychotherapy, etc. are only means to sociometric knowledge, not ends in themselves. They are

[5] Almost every issue of SOCIOMETRY adds to this literature. Note also the inclusion in research methods textbooks of such thorough articles as those of Charles P. Loomis and Charles Proctor, "Analysis of sociometric data" in Jahoda, M., Deutsch, M. and Cook, S. W., *Research Methods in Social Relations,* Dryden Press, New York, 1951, p. 561 ff.

instruments by which necessary knowledge of individuals, of groups, of communities can be obtained in order to derive general scientific principles, to effect therapy or social reform. He is critical of those who confuse "the responses received in the course of sociometric procedures, however spontaneous and essential they may appear" (21) with sociometric "facts" themselves, just as he is critical of those who accept what they may merely observe without these procedures as basic facts of behavior and social relationship. For Moreno, "a theory of human relations cannot be founded without propelling human groups into action" (134). The purpose of sociometric methods is just this. And sociometric facts cannot be known unless this has been achieved.

This is the basis of Moreno's distinction between "near-sociometric" and sociometric studies and between diagnostic and action criteria (123, 124). Tests which ask for verbal answers to questions that are only hypothetical in their ultimate meaning to the respondents are not action tests. Nor are observations of the overt attractions and repulsions people exhibit necessarily sociometric studies. Sociometric method seeks to reveal not just what people say or even what they do, but what they really want. The true sociometric study must permit actualization rather than mere response. The method must "provide the subjects with the opportunity to get into immediate action" (134-5). "It is a revolutionary category of investigation. It upsets the group from within. It produces a social revolution on a microscopic scale. If it does not produce an upheaval in some degree, it may arouse suspicion that the investigator has modified it so—in respect for an existing social order—that it becomes a harmless, poverty-stricken instrument" (124-5).

Research techniques and studies which fall short of his ideal are not dismissed by Moreno. But he never fails to criticize such studies as less than "sociometric". The heart of his criticism is the charge that the techniques fail to be "action methods", that the research situation is "contrived." In these criticisms, Dr. Moreno, consistent with his view of human nature and of society as spontaneous and creative, is affirming his belief in the revolutionary mission of sociometry.

This review is not the proper occasion for an extended appraisal of the sociometry of Dr. Moreno. Perhaps the publication of the revised edition of *Who Shall Survive?* will present such an occasion. But the sketch of sociometry which this article has attempted suggests several problems which should be openly recognized.

The first problem is that of systematization. It would be desirable for the theories of sociometry to be stated in a systematic way, especially because

of the wide claims made for sociometry by its proponents. Such a statement should embrace the older, less inclusive systems which sociometry seeks to supersede. Although major philosophers, dynamic psychologists and sociologists are referred to from time to time, such fundamental concepts as socialization, unconscious motivation and personality are dealt with only by implication. The problems of concensus, of social equilibrium, of norms, values and institutional patterns are but indirectly considered. The essence of each of these contemporary concepts—and others—can surely be integrated into the theory of sociometry.

The second problem concerns the special language of Dr. Moreno's sociometry. One cannot object to the development of a new vocabulary for new ideas, nor even to the re-expression of older ideas in new terms. This is inevitable when an inclusive system of thought is emerging. Furthermore, the stimulation of the metaphor, the verbal analogy and the fresh phrase often outweighs the disadvantages of imprecision and unfamiliarity which accompany them.

A long list of special words could be compiled. Some of them are: tele, social atom, super-atom, socioid, psychological networks, cultural conserves, classoids, sociostasis, co-action, creatocracy, theometry, etc. They are provocative words; some are, as Dr. Moreno writes, "metaphors for psychosocial experiences" (65). The meanings of some of these are clear; the meanings of others are not. The imaginative and creative mind of Dr. Moreno could not, and should not, be fettered by the requirement that his vocabulary fulfill all at once the canons of operational science. But those concepts which have already been operationally defined should be distinguished from those still in the stage of metaphor.

The third problem has to do with the fundamental postulates and concepts of sociometry. Dr. Moreno has given much attention to expounding and discussing such ideas as spontaneity, tele, and action-research. But what is spontaneity? How does one know when a person is acting spontaneously? If novelty of behavior—in the extreme, psychotic unpredictability—is not the measure of spontaneity, then what is? How is the theory that socialization is basic to personality reconciled with the theory of spontaneity?

Similar questions arise when the idea of tele is considered. Are not attraction-repulsion interactions expressions of social learning? Are sociometric relationships any less culturally patterned than the more external relationships merely because they are less obvious? How can one criterion of interaction be *demonstrated* to be more basic than another?

In the method of research-through-action, what are the standpoints for observation and measurement? How can the investigator perform as a standardized instrument?[6] Can experiments in which observer and subject are merged in a single dynamic, changing and uncontrolled experience be repeated so that the results can bear on general hypotheses? Do these methods lead to understanding *and* prediction?

These questions—and more—are not new to Dr. Moreno. But they deserve further specific consideration. They are not problems for sociometric theory alone because they go to the essence of social reality, to the definition of the very subject matter and frame of reference for a science of social behavior. Dr. Moreno's contribution in this most recent book would have been a notable one even if its only purpose had been to call attention to these questions.

[6] The selection, "Frame of reference for testing, objectifying and measuring the social investigator", pp. 114-118, is most suggestive, but it leaves this question unanswered.

A NOTE ON SOCIOMETRY AND GROUP DYNAMICS

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The time has come to point out some of the errors which have been made in the course of the history of sociometry and which have added greatly to the confusion as to what sociometry represents. One of the red herrings was the blanket "assumption that an individual's sociometric score, whether calculated by the crudest or by the most refined techniques, is a measure of his acceptance *by the group*." This is, "if not a fallacy, at least a not wholly true interpretation of sociometric facts."[1]

Obviously, an acceptance by a group is not possible. The group is a dynamic reality but it is not someone who can answer questions or someone who can accept or reject. However important it is to separate the sociological from the psychological plane of systematization, we should not mix up this methodological problem with the elementary problem of inquiry: whom to choose as an associate in a specific activity.

Another red herring has been the so-called group decision advocated particularly by Kurt Lewin. Just as a group cannot accept or reject an individual, a group cannot make decisions. It is an unfortunate and misleading phrase.

As the theory and practice of what might be called group decision stems in essence from sociometry and is closely related to "sociometric group action" and "sociodrama," let us take an illustration from our own literature and consider the theoretical principles involved in sociometric group action and sociodrama. The first principle is the active and full group or *audience participation*. "Die Teilnahme des Publikums: Die Wandlung der Zuschauer in Zuschauspieler, des Zuschauerraumes in ein Zuschautheater versetzt die Regie in ein neues Versuchfeld. Die Teilnahme des Publikums muss von Willkür befreit sein."[2] "The participation of the audience must be gradually freed from chaos and lawlessness."[2] . . . "The total population is invited to a

[1] It is a pleasure to read this honest admission of Northway in her book *A Primer of Sociometry*, pp. 38-39, that she is "at least partly responsible" for this misconception. I remember having protested repeatedly but the vogue in favor of this interpretation was too strong and so I let it go, hoping that experience and time will cure the mistake.

[2] See *Das Stegreiftheater*, 1923, p. 12, *The Theatre of Spontaneity*, p. 23, Chapter "Die Teilnahme des Publikums" (Audience Participation). Here the concept of audience participation is discussed in the context of roleplaying and sociodrama. I refer here to the German edition of the book with which Lewin was acquainted before he came to the U.S.A.

meeting and addressed in respect to the question of how the population can be selected for the new community." . . . "It is easy to gain the cooperation of the people tested as soon as they come to think of the test as an instrument to bring their wills to a wider realization, that it is not only an instrument for exploring the status of a population, but primarily an instrument to bring the population to a *collective self-expression* in respect to the fundamental activities in which it is or is about to be involved."[3]

The second principle is *the warming up of the participants in the direction of action*, the linking up of motivation with action. A sociometric test fixes the act of choice and the expected change and realization of choice into the actional drive of the participant; the warm up to the sociometric choice carries the participant through into action. "I have developed two tests in which the subject is in action for his own ends. One is the sociometric test. From the point of view of the subject this is not a test at all and this is as it should be. It is merely an opportunity for him to become an active agent in matters concerning his life situation. . . . The second test meeting this demand is the spontaneity test. Here in a standard life situation the subject improvises to his own satisfaction."[4] . . . "Sociometry in communities and the psychodrama in experimental situations make a deliberate attempt too bring the subjects into an experimental state which will make them sensitive to the realization of their own experiences and action-patterns. . . . ***In the social sciences, the subjects must be approached in the midst of an actual life-situation and not before or after it.*** They must be truly themselves, in the fullest sense of the word. . . . It is evident that ***the situation to be measured must be caught in statu nascendi and the subjects warmed up to it.*** This emphasizes the enormous importance of the concept of the Moment for all conceptual thinking relevant to the preparation of truly genuine experiments in human societies."[5]

The relation between motivation and action is the crux of dynamic sociometry and dynamic sociodrama. The linkage between motivation and

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[3] See *Who Shall Survive?*, First Edition, 1934, pp. 356 and 341. I am purposely quoting from the first edition here because it is the one with which Lewin was acquainted many years before he became active in sociometric research and group dynamics.

[4] See the first edition of *Who Shall Survive?*, p. 15.

[5] See "A Frame of Reference for Testing the Social Investigator," SOCIOMETRY, Vol. III, No. 4, 1940, p. 317; this too, was written long before Lewin published his study on group decision, "Forces Behind Food Habits and Methods of Change," *Bull. Nat. Res. Council*, 1943, 108, 35-65.

action is cemented by the warm up to an act of choice which has, in dynamic sociometry, the character of a resolution, in sociodrama the character of social integration and cohesion.

There must be some factors in tele which make choice making *in expectancy of forthcoming action* much more significant than without it, and also more effective when a large number of individuals are involved, than when choice and action is to be taken by an individual alone. *The psychology of action cannot divorce the act from the actor, the actor in situ, and the single actor cannot be separated from the ensemble of actors in situ.* A decision making in groups, whether it is made in religious, political or industrial settings, without the application of sociometric and sociodrama methods cannot be comprehended. That may be the reason why the group dynamic workers have promptly appropriated, as if by an act of group decision, role-playing and sociodrama for their research.

The third principle is *the result of the meeting* which I have called the "omnitele," the *concensus* of the group, a catharsis of integration, a social learning process obtained through rapid clarification and action insight. This is what Lewin calls group decision. But the question is not the name which is given to this experience, the question is how this process manifests itself, what consequences it has and how it is measured. The effect of the concensus becomes visible in the life situation later, in situations in which the social problems treated in the session come to a test.

If, at the end of a sociodrama session a vote is taken and if in a group of one hundred participants there is but one dissenter, then there is no "group" decision. As it happens rarely in sociodramatic sessions that there is unanimous decision on any social issue, group decision, understood as the complete approval of all participants, is a fiction. One way to measure the warm up of a group to its gradual and growing participation and integration is neither voting nor the magic assumption of a unanimous decision; it is the securing of the sociogram of the group taken at short intervals in crucial stages of the session, either by keen observers or through actual testing before the meeting begins and after the session is ended.[6]

[6] See "Sociometry and Sociodrama in Industry," by J. L. Moreno and Edgar Borgatta, SOCIOMETRY, Vol. XIV, No. 1, 1951.

SOCIOMETRIC ANALYSIS OF INFORMAL GROUPS—THEIR STRUCTURE AND FUNCTION IN TWO CONTRASTING COMMUNITIES

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ATIRRO AND SAN JUAN SUR

For the present empirical sociometric analysis of clique structure and function, the communities of Atirro and San Juan Sur, Costa Rica were selected. The bases for choosing these two settlements were land tenure, pattern of settlement, relative size and isolation from the influences of other localities, and purity of type.

Atirro is an hacienda, village-type community of 60 families (296 persons), and exhibits a highly concentrated pattern of settlement, with the entire population and their local institutions aggregated into a small village cluster.

In contrast, San Juan Sur is a peasant-farmer, open-country type settlement of 75 families (446 persons) characterized by a marked spatial separation of families so that there is no important cluster of dwellings.

Methodology. As a means of determining the informal social structures in both localities (i.e. discovering the clique and congeniality relationships), the visiting patterns of the people had to be ascertained.[1] This was accomplished through the use of a schedule which was personally administered. From the standpoint of consistency and simplicity, it was decided to restrict the analysis to the family as the visiting unit.[2]

To determine the extent and nature of family visiting, sociometric questions were used, some of which were the same as those used by Loomis —family visiting and borrowing—in similar studies,[3] and others were formulated and adapted to the rural situation of Atirro and San Juan Sur.

Different questions were formulated in an attempt to determine the

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[1] Charles P. Loomis, *Studies in Applied and Theoretical Social Science* (East Lansing: Michigan State College Press, 1950), pp. 85-146.

[2] With reference to the multiple-member families (two or more members,) visiting was considered to be family visiting if both parents participated, or if one parent and at least one other family member were involved. In a large proportion of instances, the family visiting, indicated in the sociograms, involved both parents as well as other family members.

[3] Charles P. Loomis, *Informal Groupings in a Spanish-American Village* (SOCIOMETRY, A Journal of Inter-Personal Relations, Vol IV, No. 1, February, 1941), pp. 36-51.

extent to which the clique relations of the families extended through the various types of social situations. It was reasoned that if the families generally have one basic clique to which they belong, the names given in response to the different questions covering the various type of situations involving social interaction, would be essentially the same with the deviations being characteristic of the particular situation.

All questions were carefully tested, and revised several times to insure their usefulness before their inclusion in the final schedule. These questions as they appeared in the schedule are:

1. Which of the families do you visit most frequently?
2. In the event that you were to give a fiesta who are the families you would want to invite first?
3. If you were to become ill who are the first families that would come to see you?
4. Who are the families in whom you have complete confidence and with whom you would feel free to discuss your personal problems?
5. Who are the families from whom you would borrow should the need arise?

These questions served to single out the clique leaders and groupings when charted sociometrically. These clique groupings are centered around their informal clique leaders who in relation to their followers, exercise a disproportionately large influence in motivating group and individual behavior. Factors partially accounting for this greater influence of leaders are their personal qualities, value orientations, ability, and their greater number of contacts with their followers.[4]

Prestige leaders. Although the preceding questions search out the clique leaders by indicating the number of visits families receive, they do not determine the prestige leaders of the community.

In order to ascertain these, the question utilized by Loomis[5] concerning the people's selection of individuals to represent them on a committee was adapted to the rural culture under study.

The adaptation which proved most effective after considerable testing was the construction of a hypothetical situation in which the informants were asked, "Let us suppose that here in San Juan Sur (or Atirro) a problem arose which affected all of your lives, and was of such a nature as to make your situation unbearable." "So you decide to meet with all the other com-

[4] Loomis and Beegle, *op. cit.*, p. 161.
[5] *Loc. cit.*

munity members and select from among your group three persons to represent you on a commission charged with the responsibility of doing something about the situation." "Who are the three individuals you would select to form such a commission?" After the names were given by the informant, then he was asked, "Now, which of these three persons is your first, second, and third choice?"

A second question for the same purpose—finding the prestige leaders—was composed following the results of an investigation among the rural people in the Turrialba region outside of Atirro and San Juan Sur from which were gathered the qualities these people felt their leaders should possess. This question represents an attempt to employ a different type of approach in singling out the prestige leaders—being based on the local norms and value attitudes.

In this question the informant was asked, "Among the persons with whom you are acquainted, who are the ones you consider to be the most capable, honorable, and active, and who concern themselves most over your difficulties and those of the rest of the people living in this area?"

These two questions concerning the prestige leaders as well as those concerned with the informal interaction patterns of the people were strategically placed throughout the schedule. They were integrated with questions of other types in such a manner as to eliminate any tendency toward a meaningless repetition of the names first given by the informants.

As the clique leaders exercise informal influence in the daily lives of the various members of their clique groupings, the prestige leaders utilize their positions of status in times of tension and crises to influence the community members as to ways and means of solving their communal problems.

The example of Maximino (No. 66 in the socograms) of San Juan Sur who is the foremost prestige leader in the community will serve to illustrate this point. When the seventy-five families living in San Juan Sur were asked which three individuals in the community they would select to represent them on a commission designed to resolve a community problem, fifty-nine of them selected Maximino, with fifty-four of this group listing him as their first choice.

While the man had a type of personality to which many objected, the people give him credit for obtaining their school house and for many of the other improvements that have been made from time to time in the community. He has been known to travel to San Jose to see the President of Costa Rica about matters pertaining to the improvement and welfare of the community.

As one informant stated, "Maximino is a very good man. When I had puerperal fever the night my twins were born he went from house to house gathering the people together to take me to Turrialba, then they carried me in my bed all the way down to the hospital."[6]

That Maximino concerned himself over the affairs of the community became readily apparent upon first entrance into the village. The first contact with people was made in mid-afternoon at one end of the community. By nightfall the news had traveled all the way across the settlement to Maximino (a distance of five kilometers) and the next morning he traveled on foot to Turrialba in order to find out the purpose of our appearance in San Juan Sur.

The other prestige leaders of San Juan Sur indicated in the sociograms received 24, 18, 12, and 9 selections respectively.

While in San Juan Sur one prestige leader supersedes the others to a considerable degree, in Atirro there are two prestige leaders of foremost importance. The one, Marcelino (No. 68 in the sociograms) received 32 selections and was listed by 15 of these as their first choice. The other, Anastasio (No. 88) received 29 selections with 8 of them being first choices. The other prestige leaders indicated in the Atirro sociograms received 20, 17, and 14 selections respectively.

It is significant to note that the families of these two major prestige leaders in Atirro are also the major clique leader families of the village with No. 68 having not only a somewhat greater prestige but also being the slightly more popular clique leader family of the two.

In an effort to gain a better insight into why the various individuals chosen as prestige leaders in the two communities were selected, a number of families in each locality (10 in Atirro and 11 in San Juan Sur) were asked to state their reasons why they had selected the individuals whose names they had given in response to the question concerning the forming of a commission. Their replies are listed as follows:

No. of informants	*Responses of informants in Atirro*
8	Honorable and respectable
9	Concerned for the welfare of others—the people and the community
6	Active and hard-working
3	Intelligent and capable
2	Carry out in good faith responsibilities charged to them
2	Serious, genuine proper (formales)

[6] This woman lived seven kilometers from the hospital.

No. of informants	*Responses of informants in Atirro*
1	Are not hypocrites
1	Sincere
1	Progressive
1	Have greater contact with the rest of the people
1	Are correct in their manner of thinking and acting
1	Serviciales (ready to lend a willing hand)
1	More refined social manners
1	Are not charlatans (idle talkers)
1	The whole world turns to them when in time of major need.

No. of informants	*Responses of informants in San Juan Sur*
11	Honorable and respectable
9	Concerned for the welfare of others—the people and the community
4	Progressive
4	Serviciales (ready to lend a willing hand)
4	Intelligent and capable
2	Have superior preparation (schooling, etc.)
3	Serious, genuine, proper
2	Are not hypocrites
2	Active and hard working
1	Charitable towards the people
1	Religious persons of good conscience with everyone
1	Will do no harm to anyone, but desire good for all
1	Young and healthy
1	Loyal
1	Humble
1	Treat all people equally
1	Possess the spirit of companionship—will always accompany one
1	Do not expect monetary recompense for their services to the people
1	More affable with the people
1	Have the facility and time for serving
1	Do not molest anyone in any way
1	Are not charlatans (idle talkers)
1	Have sufficient resources which enable them to give their time to an activity of the community
1	They have already served on commissions for the people and have done well
1	They are the principal persons in San Juan Sur

It is of significance to note that in neither community did intelligence and capability rate anywhere nearly as high as being honorable and being

concerned with the welfare of others. The informants emphasized these two qualities elucidating with reference to each of them.

A difference of interest is the relative importance placed upon "progressive" by informant families in the two communities. In San Juan Sur where the majority own their own homes and small plots of land and where community affairs are in the hands of the respective families, four informant families listed "progressive" as a factor in determining their selection of persons to serve on a commission charged with the community welfare, while in Atirro where the entire community is owned by the hacienda owner and where community affairs are largely in his hands, "progressiveness" was listed by only one family.

While those of San Juan Sur place somewhat greater emphasis upon progressiveness than those in Atirro, there is a much larger consideration given to active, hard-working individuals in Atirro (6) than in San Juan Sur (2) as a consideration in prestige-leader selection. In San Juan Sur two families listed superior preparation (schooling, etc.) as being important in the determining of a leader while there were none in Atirro who even considered this as a factor in leadership. This is interesting in view of the fact that there is a slightly higher percentage of children in school (elementary), a higher percentage of persons who can read and write, a greater proportion of people who have been provided with their education, and a higher per cent of people who own books in San Juan Sur than in Atirro.

One other point of considerable interest is the lack of influence of religion in the selection of prestige leaders. Not one family in Atirro listed the "religiousness" of the individuals as a factor in their selection, while only one family in San Juan Sur was concerned with this factor. This is further illustrated when considering the fact that one of the prestige leaders in Atirro was, according to Catholic Church standards, born in sin (born of parents who were unwed), and one of the prestige leaders in San Juan Sur is living in sin (living with a woman to whom he is not legally wed). While neither of these two individuals were the foremost prestige leaders of the communities they were nevertheless men of considerable respect and stature.

The positions that the various prestige leaders occupy in the community social structure seem to be influenced to a marked extent by the degree to which they manifest, in their individual behavior, the norms of their social group.

Personality factors do not enter into the selection of prestige leaders nearly to the extent that they do with reference to the clique leaders. This is partially due to the different nature of the needs these two types of

leaders fill. While the clique leaders fill the more specific needs—needs of his particular clique, the prestige leaders fill general needs—those of the whole community—and do not have the personal contact in their leadership functions that the clique leaders do.

Analysis of Choice Responses

Visiting. Visiting provides the families of both communities with their chief social activity, and their major form of diversion in life. A large part of this visiting is carried on by the family groups visiting in one another's homes.

Analysis of Figure 1 reveals that in Atirro the large proportion of visiting is carried on between friends. There is comparatively little social interaction of this type between relatives (blood or by marriage) and compadres (Catholic Church relationships). This is partially explained by the considerable mobility in and out of the settlement with fourteen or 23.33 per cent of the families having been residents of the community less than one year at the time of schedule administration. There is, consequently, a relatively small number of related families, either church or kinship.

Of the 174 visits graphically depicted in the sociogram, only eight or 4.60 per cent are outwardly oriented indicating a remarkable degree of integration considering the length of time a number of families have lived in the settlement. In the case of Atirro, however, the factor of geographical isolation must be taken into consideration when considering the extent of integration. The village itself is 14.0 kilometers from Turrialba and 8.4 kilometers from La Suiza which presents a barrier of distance to any large degree of visiting in these outside centers.

As indicated by the Figure, the various families comprising the community are aggregated into eight cliques oriented around and composing the two major polar bodies whose centers are families No. 68 and 88.

As revealed by the visiting relationships, the third ranking clique leader family of the community is No. 42 who shows mutual visiting with 68 and though, with his followers, comprises a portion of this larger clique, is nevertheless a clique leader of some importance.

There is also one small clique composed of three families, that of the hacienda owner (No. 99), the commissary owner (No. 98), and the commissary owner's father (No. 41). The associations of these latter families are largely directed outside of the community. Their social interrelationships within the community are with each other, and the only informal social contact of this type with the rest of the community is provided by family

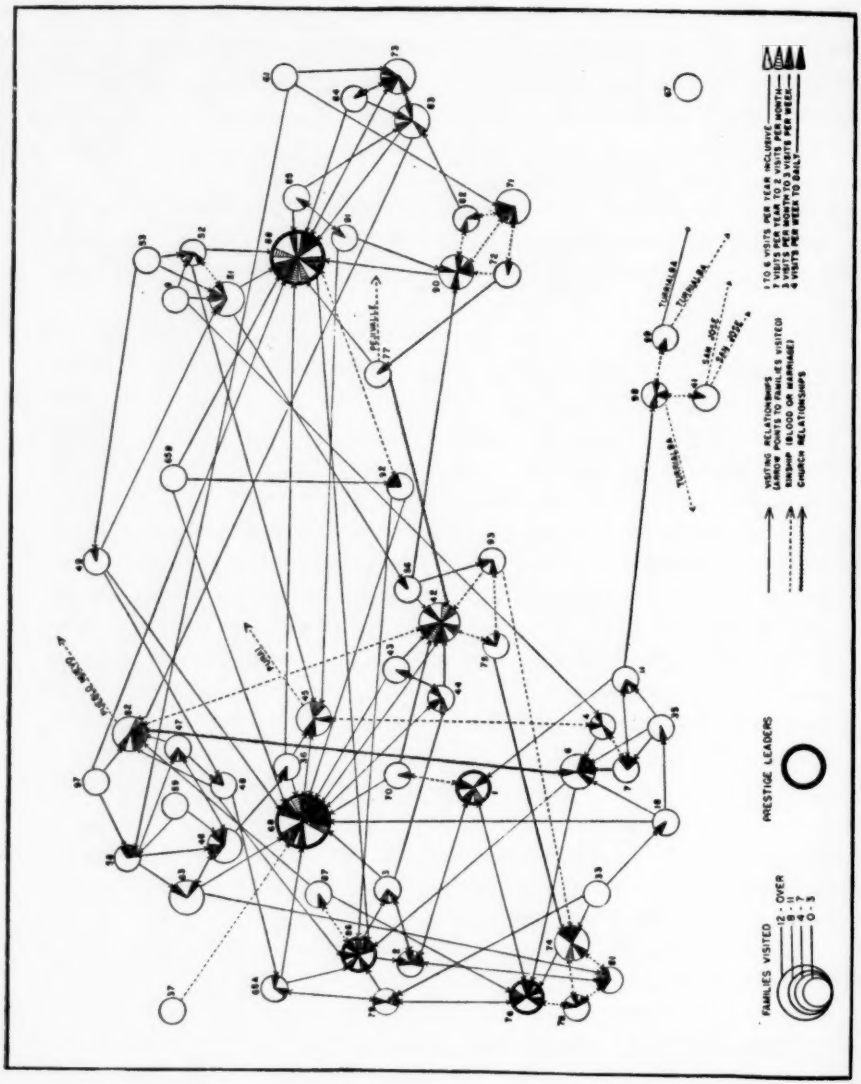
VISITING RELATIONSHIPS
(ARROW POINTS TO FAMILIES VISITED)
KINSHIP (BLOOD OR MARRIAGE)
CHURCH RELATIONSHIPS
1 TO 6 VISITS PER YEAR INCLUSIVE
7 VISITS PER YEAR TO 2 VISITS PER MONTH
3 VISITS PER MONTH TO 3 VISITS PER WEEK
4 VISITS PER WEEK TO DAILY
PRESTIGE LEADERS
FAMILIES VISITED
12 - OVER
8 - 11
4 - 7
0 - 3

FIGURE 1
VISITING PATTERNS OF THE FAMILIES LIVING IN ATIRRO, COSTA RICA

No. 11 who visits the commissary owner family. This visiting relationship is not reciprocal, however, as is indicated in the Figure.

There is only one family in the entire community who is completely isolated from visiting contact with others (No. 67). It was the head of this family who explained that he remained apart from the rest of the people, and who was later confined for some time in the hospital for the mentally ill in San Jose.

Another family (No. 37) is almost a complete isolate as indicated by the fact that they receive visits from no one and visit only one family—the informant's brother-in-law (No. 68) who is one of the major prestige and clique leaders in the community. The wife of this family further indicated their lack of acceptance when she stated, "We are afraid to visit because the people here are very eccentric."

In the system of social interrelations, as indicated by this sociogram, family No. 92 while being neither a prestige or clique leader family, occupies a strategic position. In any program of directed social change this would be a key family as is indicated by their patterns of visiting. The three families they visit (68, 88 and 86) are the three top prestige-leader families of the community, while two of these (68 and 88) are also top clique-leader families, and the third is one of the more important clique leaders of the village (86). One of the families visited (88), are the parents of the family head, and this visiting is reciprocal.

Family No. 88 is one of the two central cores of the community, forming the nucleus of three different cliques and being visited by members of other cliques for whom family No. 68 is the nucleus. The head of this family is Anastasio, a quiet, unassuming, hard-working peon (day laborer) who is 55 years old and has worked in Atirro for 30 years. While he has no formal education and cannot read or write, he has by his own efforts learned the trade of carpentry and is employed by the hacienda in that capacity.

Although Anastasio is the leader, the influence of his wife should not be underestimated. Together they form a family unit that is congenial and popular among the other families.

Family No. 68 is the main clique and prestige family of Atirro. The male head of the family is the leader both from the standpoint of prestige and clique but in this latter respect, again as in the instance of family No. 88, the wife also contributes to their popularity.

While Marcelino like Anastasia manifests the norms of the group in his behavior, he is, in his personal characteristics, a very different type of person. He is a confident, well appearing progressive man of 43 years. He is more affable in his manner than Anatasio and newcomers to the settlement tend to become acquainted with him somewhat more readily. He lives at a crossroads in the central section of the community while Anastasio lives at one extreme end of the settlement. He has completed three grades of schooling and can read and write. He places great emphasis upon education as is indicated by the sacrifices he and his wife are making to put their daughter through the secondary school in Cartago. She is the only child in Atirro currently attending the secondary school.

FIGURE 1
VISITING PATTERNS OF THE FAMILIES LIVING IN ATIRRO, COSTA RICA

Marcelino like Anastasio is a carpenter of the hacienda. In addition, he is the newly appointed policeman, the electrician and the local agent for the three national newspapers of Costa Rica, and more recently became the local agent for *Reader's Digest* magazine.

The first introduction to Marcelino's family came quite by accident shortly after entrance into the settlement. The people of the community as a whole were cool and suspicious; but by chance, however, one of the first houses visited was Marcelino's where friendliness and welcome were extended.

A review of the sociogram with reference to frequency of family visiting reveals that for most families in the settlement it is a daily, or at least a weekly occurrence. Those circles without shading receive no visits. As the shading goes from light to dark the frequency of visiting received increases, as is indicated in the Figure by the clique leader families 86, 76, and 68 who were visited daily by a majority of their clique followers. With reference to 86 and 76 particularly, all but one of their follower families in each instance visited them daily.

An analysis of Figure 2 reveals that in San Juan Sur the large majority of the visiting is between relatives—conjugal or consanguinal. While visiting between friends outnumbers that of "compadres," the compadre relationships are nevertheless of significance. Of the 225 visits graphically depicted in the sociogram, only 19 or 8.4 per cent are oriented outward, indicating a well integrated social system. Of the seventy-five families comprising the community, only one family (1.33%) has lived there less than one year. The majority of the families are long-time residents of the community as indicated by the fact that over half the family informants had resided in the community for twenty years or more at the time of schedule administration.

As is indicated in the sociogram, the social structure of the community is composed of twelve cliques ranging in size from three to ten families each. The largest and most important of these clique groupings is that led by clique leader family No. 41. As is indicated by the sociogram, not only is this clique large and in a strategic position in the system of interrelationships, but with one of its followers being a leader of still another clique, and through other interrelationships between the member families of the two groupings, there is actually a clique within a clique.

The "leader" in clique-leader family No. 41 is the female head, a woman of fifty-five named Ramona, who has had no formal education and cannot read or write. In a community where there are wide differences in the personal qualities of some of the strategic families, Ramona is the leavening influence. While some of the families may dislike others, Ramona and her husband

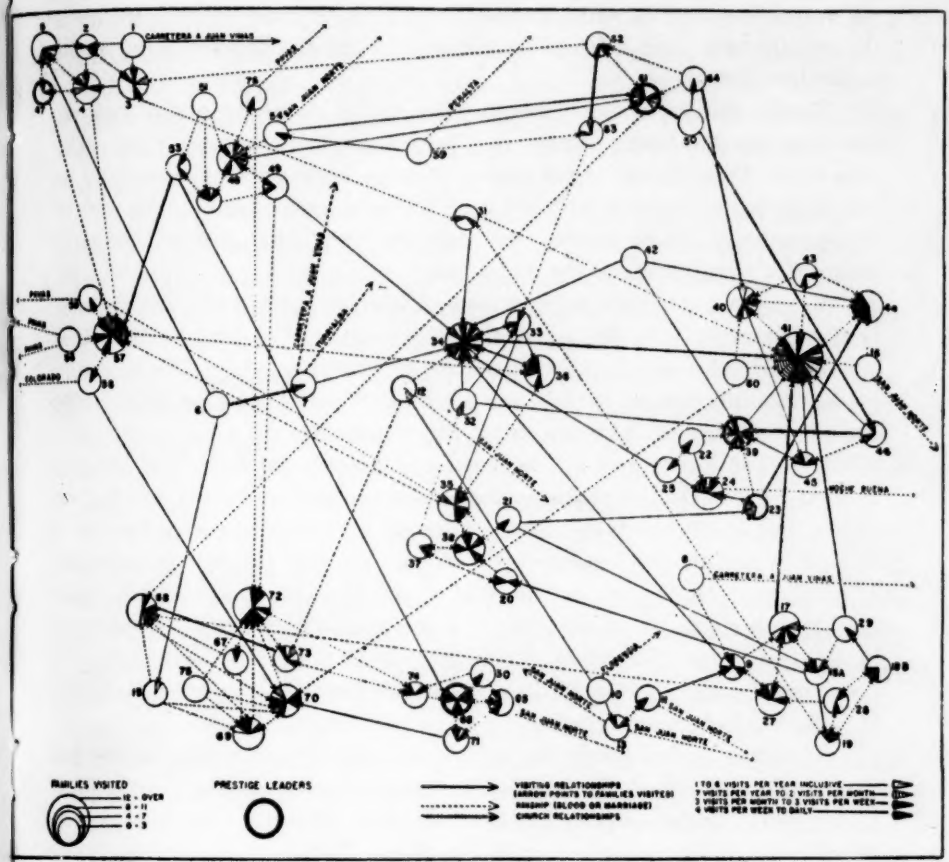
FAMILIES VISITED
12 - OVER
8 - 11
4 - 7
0 - 3
PRESTIGE LEADERS
VISITING RELATIONSHIPS
(ARROW POINTS TO FAMILIES VISITED)
KINSHIP (BLOOD OR MARRIAGE)
CHURCH RELATIONSHIPS
1 TO 6 VISITS PER YEAR INCLUSIVE
7 VISITS PER YEAR TO 2 VISITS PER MONTH
3 VISITS PER MONTH TO 3 VISITS PER WEEK
4 VISITS PER WEEK TO DAILY

FIGURE 2

VISITING PATTERNS OF THE FAMILIES LIVING IN SAN JUAN SUR, COSTA RICA

Juan like and appear to be liked by everyone. One of the hardest tasks at the time of schedule administration was to succeed in separating Ramona from her friends long enough to talk with her.

Ramona's house is literally a center of the community, and aside from the visiting activities, other communal-type functions are carried on there. One day, for example, they had all gathered to make tamales and before the day was over they had made hundreds of them.

Ramona is described as a lovable, kind, active, helpful, elderly woman who is always helping others especially in times of birth, sickness, and death. Juan, her husband, is a sort of amateur curandero (herb doctor) who provides

various of the families with remedies from time to time, while Ramona is the main partera (mid-wife) of the community and has brought many of the babies into the world.

Family No. 39, while forming a part of the clique for which Ramona and Juan are the leader family, is a leader family in its own right. The male head, Angel, is one of the leading prestige leaders of the community as well as forming, together with his wife, a clique leader family. His wife is the community school teacher and together they form one of the most progressive family units in the community.

Family No. 34 while being a clique leader of considerable consequence is also important from the standpoint of its strategic position in the social system. Though there are a comparatively small number of families primarily drawn into this clique (4 follower families), the influence of this family extends to several of the other major clique groupings.

The predominance of visiting among relatives is particularly manifested in an analysis of the two cliques whose leaders are families No. 72 and No. 48. In the first of these two cliques the in-group visiting is particularly intense as is indicated by the large number of lines running between the families. It is of particular interest to note that of the 22 in-group visits 21 of them are between relatives and the other is a compadre relationship. In the latter of the two cliques, for which family No. 48 is the clique leader, there is again considerable in-group visiting, and in this instance all visits made within the clique are between relatives.

The male head of family No. 66 is the prestige leader Maximino who has already been described. In addition to being a prestige leader, Maximino is also a clique leader—among his own relatives. However, the only outside clique with whom the members of his clique visit, is that lead by family No. 72, and they receive visits from one other family which is a member of the clique led by No. 48. A cleavage exists between Maximino's clique and a number of the other clique groupings of the community with reference to visiting.

The two smallest clique groupings in the community, one led by family No. 57 and the other centered around family No. 13, account for almost half of the outwardly oriented visiting. Of the 19 visits outwardly oriented, seven families in these two cliques account for eight of them. It may be further noted that all eight of these outwardly oriented visits are with relatives.

A review of the sociogram indicates that the large proportion of all family visiting carried on within the community is done on a weekly basis, 117 visits (57.35%). Of the remainder, 70 visits (34.31%) are daily,

14 visits (6.86%) are monthly, and 3 visits (1.47%) are yearly. It is interesting to note that the majority of the daily visiting is in-group visiting while the weekly and monthly visiting is primarily inter-group visiting. It is of further significance to note that, in proportion to their numbers, visiting among relatives is generally carried on at a greater rate of frequency than visiting between friends.

A comparison of the visiting patterns in the two communities reveals that in both the preponderant majority (over 90%) of the families carry on their visiting activities within the confines of their own locality.

In Atirro, the majority of all visiting (120 or 68.97%) is among friends, while in San Juan Sur the major proportion (161 or 71.56%) is among relatives—consanguinal or conjugal. A related factor is the greater mobility and resultant greater heterogeneity of origin of the families living in Atirro, when compared with those of San Juan Sur.

Compadre relationships are not of too great importance in either community but they are of somewhat lesser importance in Atirro.

In Atirro the social structure is comprised of eight interacting cliques of families forming into two major polar bodies. In contrast to this is the social structure of San Juan Sur, which is comprised of 12 cliques ranging in size from 3 to 10 families each. The largest clique is of considerable importance, not only because of its greater size, but also because of its powerful clique location in the functioning social system. While in Atirro there were two families which provided both the top prestige leaders and clique leaders, in San Juan Sur one family (No. 41) is foremost as a clique leader, while another family head (No. 66), is the most powerful prestige leader.

In San Juan Sur the greater integration of the families into the system of interrelationships, when compared with Atirro, is indicated in that every family had at least one visiting relationship established within the community, while in Atirro there were three families who were completely outwardly oriented in their visiting and still another family was a complete isolate, receiving visits from, and visiting no one.

The relative proximity of the houses in the two communities appears to be a factor affecting the frequency of family visiting within the community as is indicated by the fact that in Atirro, where the houses are all grouped closely together, the majority of the visiting is on a daily basis (53.01%) with the remainder being done weekly (39.76%) and monthly (7.22%).

In contrast to this, the major proportion of families living in San Juan Sur where the houses are spread out covering a considerable area, visit weekly

(57.35%) although a considerable percentage participate in this activity on a daily basis (34.31%), and a few do so monthly (6.86%), and yearly (1.47%).

Fiesta invitations. The responses of the families in Atirro to the question, "In the event that you were to give a fiesta (party) who are the families you would invite first?" indicate, as revealed in Figure 3, that the social structure of the community remains basically the same as for visiting, with some changes. The families remain oriented around their two basic prestige and

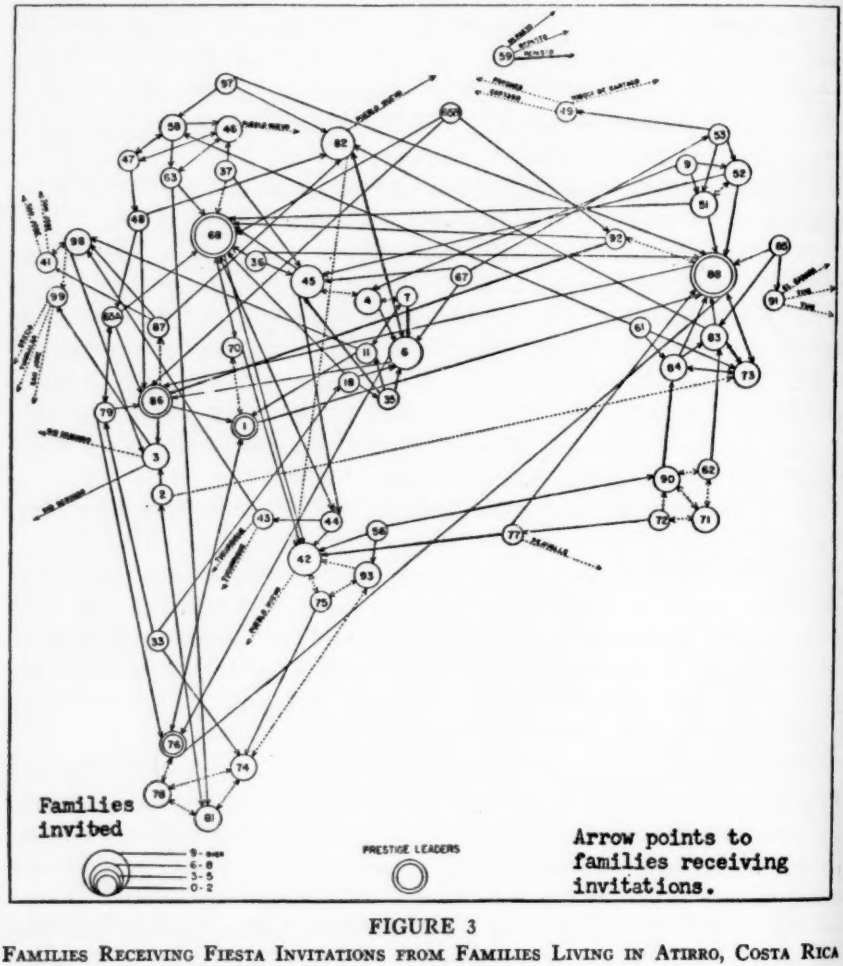

FIGURE 3

FAMILIES RECEIVING FIESTA INVITATIONS FROM FAMILIES LIVING IN ATIRRO, COSTA RICA

clique leaders, with five clique groupings centering around family No. 68 and three groupings around family No. 88.

When the 166 visiting relationships are compared with those for fiesta invitations, it is revealed that 123 (74.39%) of these are exactly the same. In fact, of the sixty families in Atirro, twenty-nine exhibited no change in their relationships with others in the community, while another twenty-three families revealed only one change.

There were only eight families in the entire settlement who indicated two or more changes in their patterns of association with the largest number of changes being evidenced by families No. 2 (3 changes), No. 76 (2 changes), and No. 68 (4 changes). In all of these, the change was either completely or largely the result of a reduction in the number of families indicating their selection of these particular families with reference to fiesta invitations, when compared with visiting.

The position of the other major prestige and clique leader family, No. 88, was changed very little in this respect, with twelve families indicating it to be among the three they visit most frequently, and eleven families indicating it to be among those they would invite first to a fiesta.

Four families appear to be completely outwardly oriented in this social situation. Of these four, one of them is the hacienda owner who, because of a higher social standing, quite naturally would not be integrated into the social life of the community. The two invitations the hacienda owner received from those within the settlement were from the commissary owner and the accountant of the hacienda who are also in a higher social standing.

Of this small clique comprised of the hacienda owner, the commissary owner and the commissary owner's father, the commissary owner appears most popular with the people with three potential invitations coming from the peon families. At his commissary, he is known to have carried some sick and disabled families for weeks and then to have forgotten at least a part of their bills. His fairness, and even generosity at times, in his dealings with the peons may have been a factor in their including him among their fiesta selections. But his family, in the event of a fiesta, would invite only those of his own social group—the hacienda owner, the accountant, and his own father.

While with reference to visiting relations, there were eight (4.60%) social contacts with families outside the settlement, there are twenty-two (12.15%) selections of outside families with reference to fiesta invitations.

Family No. 67 is now a part of the system of interrelations indicating that in the event it was ever to hold a fiesta it would probably invite families

No. 6, No. 45, and No. 53 first. This family again evidences the isolation revealed in Figure 1, however, in that none of the other families indicated they would include this family among those they would invite to a fiesta.

Family No. 92 maintains a strategic position in the system of interrelationships by indicating that it would invite prestige and clique leader families No. 68, No. 88, and No. 86 in the event of a fiesta.

It is interesting to note here, however, that only one of these three families (No. 88 who is the parent family of the male head) indicated the intention of including No. 92 among those it would invite.

In this type of social interaction, the amount of association among relatives is more frequent (60 or 33.15%) and of somewhat greater importance than it was with reference to visiting, though the relations between friends still predominates (111 or 61.33%). Compadre relations are comparatively unimportant here (10 or 5.52%) as they were in the instance of visiting (6 or 3.45%), though in actual numbers they are somewhat more numerous.

An analysis of Figure 4 reveals that the social structure of San Juan Sur is very largely the same as for visiting. The families are arrayed into twelve different cliques with the followers of clique leader family No. 41 comprising the largest group (ten families).

While the spatial arrangement of the sociogram is somewhat different from that of visiting, a study of the lines of interrelationship reveals them to be basically the same for the two sociograms.

When the 206 visiting relationships occurring within the community are compared with those for fiesta invitations, 157 (76.21%) of these relationships are revealed to be exactly the same for both social situations. Forty-one of the seventy-five families comprising the community exhibited no changes in their social relationships, while another twenty-three families indicated only one change. Only two families in the community varied to any large degree from their visiting patterns in their fiesta selections. These were family No. 33 with three changes, and family No. 34 evidencing five changes.

Although visiting is largely carried on among relatives, 71.56 per cent of the total relationships, an even greater proportion of fiesta invitations are to this group (76.79%). The number of contact among friends, on the other hand, decreases from 50 (22.22%) visiting associations to 36 (16.07%) fiesta invitations. There was only small change exhibited in the compadre relations with the fourteen visiting relationships being slightly exceeded by sixteen fiesta selections.

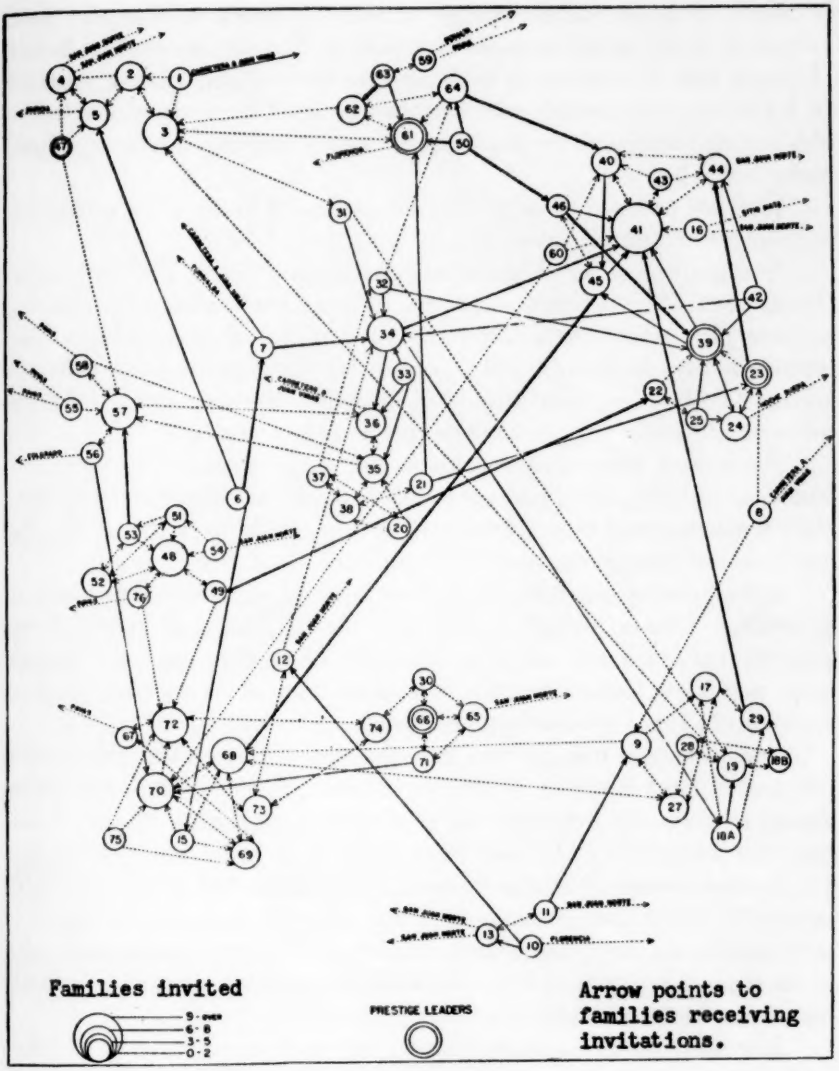

FIGURE 4

FAMILIES RECEIVING FIESTA INVITATIONS FROM FAMILIES LIVING IN SAN JUAN SUR, COSTA RICA

Another aspect of the change occurring between visiting and fiesta invitations is the greater number of selections that are outwardly oriented, 13.39 per cent in contrast to 8.44 per cent of the total visiting relations. Of the twenty-eight outside selections, twenty-six of them are with relatives, which again emphasizes the importance of this group with reference to fiesta invitations.

It should be noted however, that not one family in the entire community is completely outwardly oriented in its fiesta invitations.

A comparison of the fiesta-invitation sociograms for the two communities reveals essentially the same social structures as were noted in the visiting patterns. In Atirro, the families remain clustered around the two basic prestige and clique leader families. In San Juan Sur, on the other hand, the various families are again arrayed into twelve different cliques with the followers of family No. 41 comprising the largest group.

There have been some changes in the social structure of both communities. In Atirro, 25.61 per cent of the fiesta invitation relationships varied from those observed with reference to visiting, while in San Juan Sur the percentage of change was only 23.79 per cent.

In both communities the influence of relatives appeared more important in relation to fiesta invitations than with visiting. Although in Atirro the majority (61.33%) still indicated friendship to be the only bond between them and their fiesta selections, the proportion of invitations going to relatives (33.15%) was noticeably higher than for visiting (27.59%).

The same held true for San Juan Sur, where the families had already indicated a large majority (71.56%) of their visiting relationships to be among relatives, by exhibiting an even greater proportion of associations occurring among this group with reference to fiesta invitations (76.79%).

Another aspect of change for both communities lies in the number of outwardly oriented associations. It should be noted, however, that while in both settlements there was a limited increase in outside associations, none of the families in San Juan Sur were completely oriented outward in its fiesta invitations, while in Atirro there were four families.

Sick calls. As indicated in Figure 5, the responses of families in Atirro to the question, "If you were to become ill, who are the first families who would come to see you?" reveal the social structure to be essentially the same as that evidenced with reference to visiting and fiesta invitations.

A comparative analysis of these sick-call relationships with those pertaining to visiting reveal that 74.30 per cent of all patterns of association between the various individual families remain the same in the two social situations.

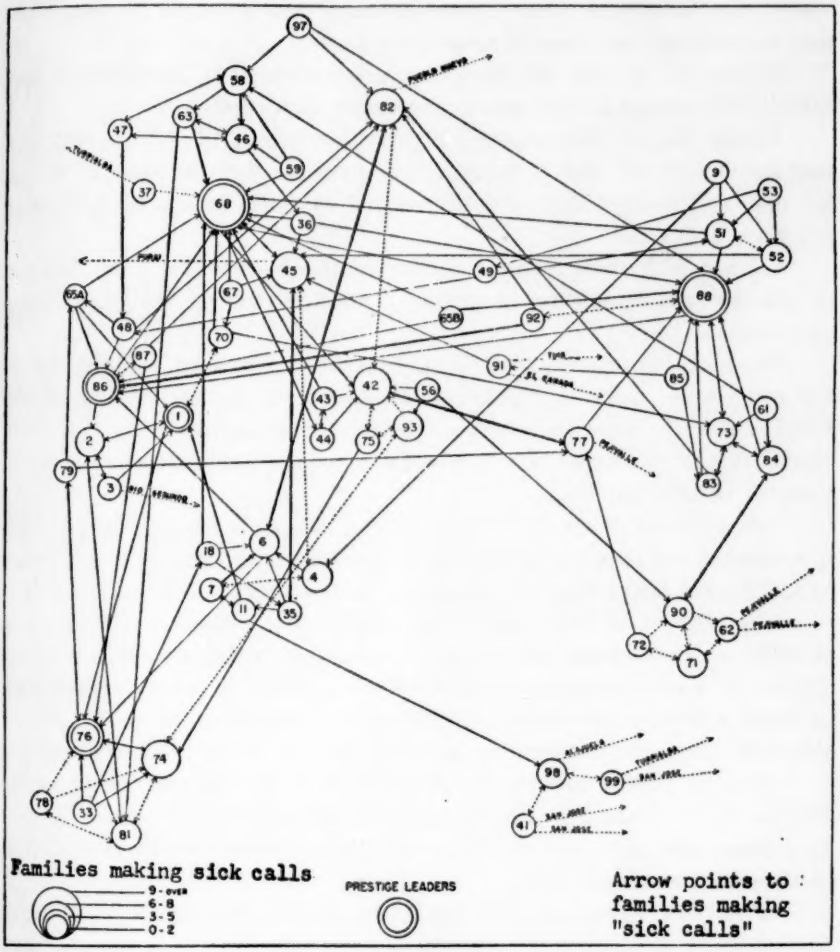

FIGURE 5
FAMILIES MAKING "SICK CALLS" TO FAMILIES LIVING IN ATIRRO, COSTA RICA

Of the sixty families, thirty-one (51.67%) evidenced no change in any of their relationships for the two situations while another eighteen (30.00%) indicated only one change. There was only one family in the entire community (No. 68) who evidenced more than two changes between the two situations. The changes manifested here were largely in the nature of an increase. Twelve families indicated family No. 68 to be among those they

visited most frequently while fifteen indicated that it would be among the first to come and see them in times of sickness.

Family No. 88 and the three cliques for whom it is the central leader exhibit little change in their relationships with each other.

Family No. 67, the complete isolate with reference to visiting, indicated that families 68, 45, and 70 would come to call on them in times of illness, but none of the other families indicated that 67 would be among the first to pay them a sick call.

Contact with those living in outside centers is somewhat more in times of sickness than for visiting (8 contacts), and less than for fiesta invitations (22 contacts).

The sick-call relationships, 92.31 per cent of which are satisfied within the community, tend to emphasize the integration of the majority of the families into the local social system in this situation with only one small clique, that of the hacienda and commissary owner, being largely outwardly oriented in this respect.

The majority of all sick calls (65.38%) are made among friends. This is somewhat less than the percentage of visiting occurring among this group (68.97%) but larger than the percentage being invited to a fiesta (61.33%).

The number of sick calls being made among relatives (28.57%) is slightly in excess of the percentage of visiting occurring among this group (27.59%), while the number of relatives being invited to a fiesta exceed both of these groups in proportion (33.15%). Compadre relationships play a relatively minor role constituting only 3.45 per cent of the total relationships.

An inspection of Figure 6, with reference to the sick calls made by the families of San Juan Sur, reveals the social structure of the community to be substantially the same as has already been indicated with reference to visiting and fiesta invitations.

When this sociogram is compared to that of visiting, with reference to changes or similarities as indicated in their structures, it is revealed that of the 206 lines of interrelationships compared, 155 (75.24%) remained the same for the two different types of social situations. There were 41 (54.67%) of the seventy-five families who evidenced no changes in their interrelationships while an additional twenty-two families (29.33%) indicated only one change. Of all the families in the community, only two evidenced more than two changes. The family revealing the greatest change was clique leader family No. 34, who was listed by ten families as one of those they visited most frequently, but who was indicated by only six families to be among those first calling to see them in times of sickness.

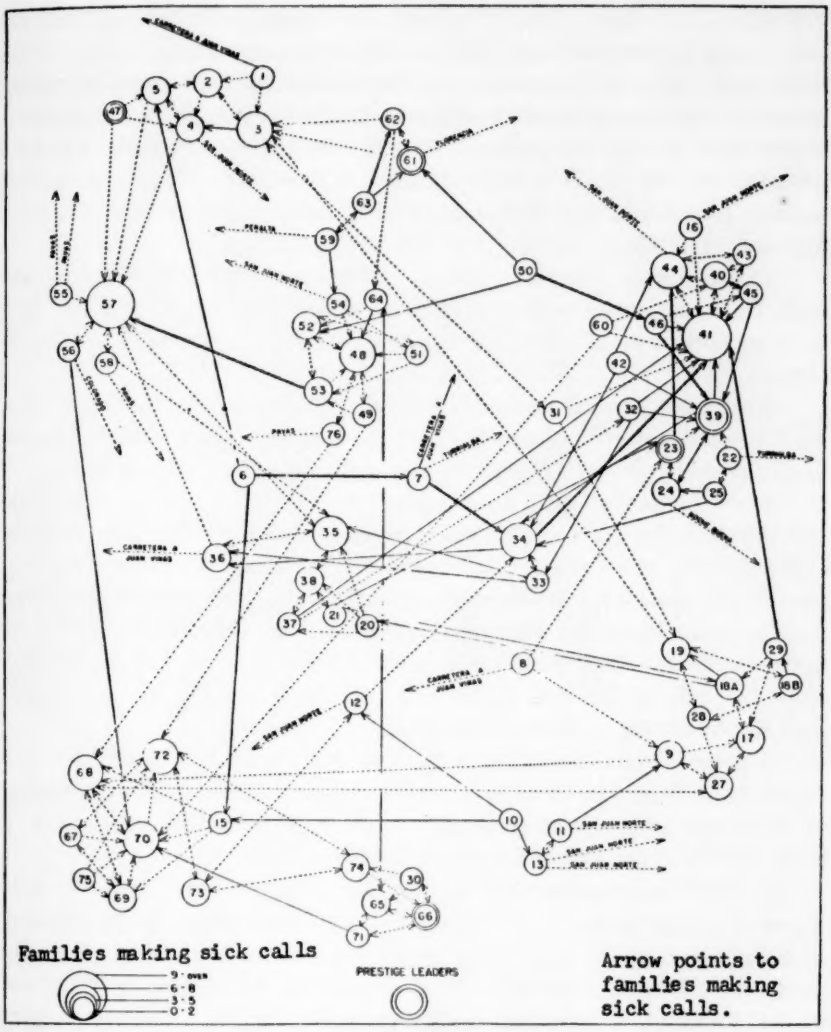

FIGURE 6

FAMILIES MAKING "SICK CALLS" TO FAMILIES LIVING IN SAN JUAN SUR, COSTA RICA

The variations (3) expressed by the other family, No. 68, was partially because of a change in size—seven associations in relation to visiting and six with reference to sick calls—and partially because of change in those families with whom it maintained contact in the two different situations.

Of the 225 associations, 75.11 per cent are among relatives, 20.00 per cent among friends, and 4.89 per cent are with compadre relations. When these percentages are compared with the sociograms for visiting and fiesta invitations the proportion of visiting among relatives is found to be somewhat higher than among the former (71.56% visiting) and slightly less with reference to the latter (76.79% fiesta invitations). The interrelations between compadres vary little, being highest for fiesta invitations (7.14%), followed by visiting (6.22%), and sick calls (4.89%).

The degree to which the various families are integrated into the community's social system with reference to sick calls, is indicated by the very large proportion of relationships (90.22%) of this type satisfied within the community.

When the three sociograms (visiting, fiesta invitation, and sick calls) are compared, the greatest degree of outside selection comes with reference to fiesta invitations (30), followed by sick calls (22), and visiting (19).

When Figures 5 and 6 are compared it is revealed that in both Atirro and San Juan Sur the social structure remains essentially the same as in the case of visiting and fiesta invitations, with substantially the same differences occurring in each case. With reference to sick calls, both communities reveal more outward movement than for visiting and less than that occurring for fiesta invitations. Both communities show a lesser percentage of relationships among friends in the instance of sick calls than for visiting, and greater than that occurring for fiesta invitations.

A point of significance lies in the fact that family No. 68 in Atirro and family No. 41 in San Juan Sur, both of whom illustrate a larger number of selections with reference to sick calls, have identical reputations as being friends of the sick and those in distress.

In both communities there is only a limited and approximately equal degree of change in the lines of interrelationship when compared with visiting, as is indicated by the percentages of all associations that remain the same for the two different situations—74.30 per cent in Atirro and 75.24 per cent in San Juan Sur. Even from the standpoint of families, 51.67 per cent in Atirro as compared with 54.67 per cent in San Juan Sur remain exactly the same through both types of social interaction.

A large difference which has been consistently noted between the communities with reference to visiting and fiesta invitations, is the proportion of associations carried on among friends and relatives. In Atirro the majority of the relationships (65.38%) are among friends, while in San Juan Sur most of the association is between relatives (75.11%). In both com-

munities, however, the importance of compadre relations is relatively minor with little difference appearing between them in this respect.

Families consulted in confidence. The responses of the families in Atirro to the question "Who are the families in whom you have complete confidence and with whom you would feel free to discuss your personal problems?" indicate as revealed in Figure 7, a social structure which, in its major aspects,

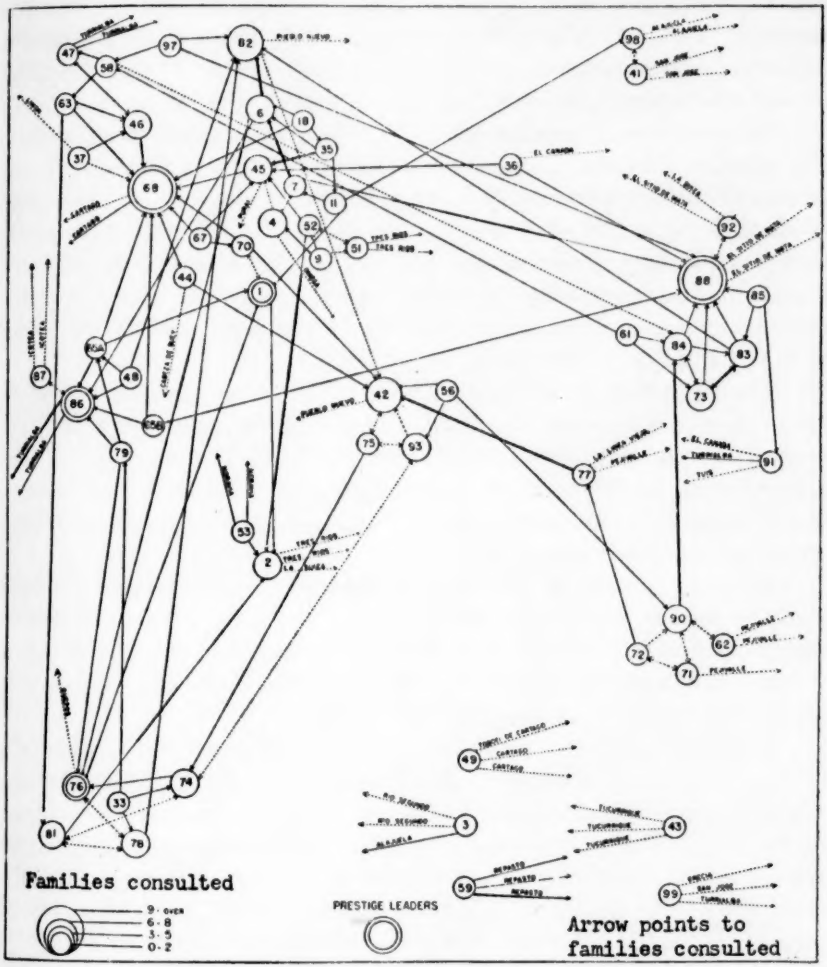

FIGURE 7

FAMILIES CONSULTED IN CONFIDENCE BY FAMILIES LIVING IN ATIRRO, COSTA RICA

is similar to that ascertained from an analysis of visiting, fiesta invitations, and sick calls, yet which varies markedly from the preceding sociograms in a number of instances.

A comparative analysis of this sociogram with that of visiting reveals that out of 166 relationships 102 (61.45%) remain the same for the two different types of social situation. Nineteen families exhibit no change in their relationships while an additional twenty-five families evidence only one variation. There are three families out of the sixty living in the community who evidence more than two changes in their relationships. These are families 84 with three changes, 88 with four changes, and 68 with six changes.

The changes manifested by family No. 84 are in the nature of an increase. The changes exhibited by family No. 88 were largely a decrease in the number of families indicating them when compared with visiting. This same situation is evidenced with reference to family No. 68, the other major prestige and clique leader of the community, who is visited by fourteen families and in whom only ten have complete confidence. Here, as in the foregoing sociograms, the greater stability of the clique relations of family 88 is made manifest when compared to family No. 68.

The proportion of outwardly oriented associations are larger than in all of the preceding social situations. Seven families in the community are completely outwardly oriented with reference to families of complete confidence, while eleven others are largely outwardly oriented in this respect. It is of especial interest to note that the two major prestige and clique leaders are among this latter group.

Though a number of these families evidence their "belonging" to local clique groupings, with reference to the other types of social situations discussed, their relative lack of complete integration into these groupings is revealed in a hesitancy to take the other members of their group into confidence and to discuss personal matters with them.

The importance of relatives as confidants, to those who are partially or completely oriented outward, is revealed in that of the 54 associations directed outside the community, 40 were kinship. In spite of this increase in the number of associations among relatives, the relationships among friends remain for the community as a whole the most important type of interrelations (50.81%), though visiting among relatives has assumed a greater importance here than for any of the four relationships discussed (43.78%). Compadre relationships are of approximately the same importance with reference to families consulted in confidence (5.41%) as for the other types of social situations already analyzed.

An analysis of Figure 8 reveals that the social structure of San Juan Sur remains very much the same as that evidenced for the other types of social situations previously analyzed.

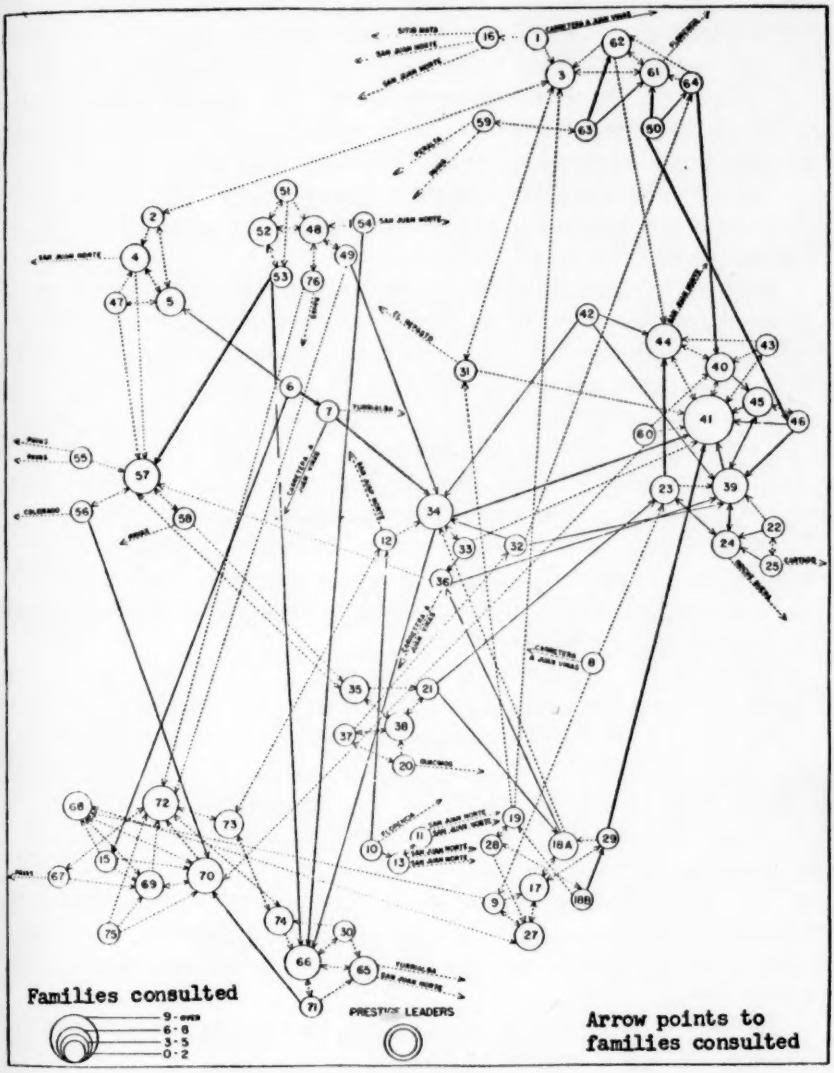

FIGURE 8

FAMILIES CONSULTED IN CONFIDENCE BY FAMILIES LIVING IN SAN JUAN SUR, COSTA RICA

A comparative analysis of this sociogram with that of visiting, reveals that of the 206 lines of relationship occurring within the community, 160 (77.67%) remain exactly the same for the two different types of social situations. Of the seventy-five families, 43 (57.33%) evidence no change in their relationships while an additional twenty-four families (32.00%) experience only one variation in their relationships. In fact, the degree of change manifested when this sociogram is compared with that of visiting is the smallest of the three comparisons (fiesta invitations and visiting, sick calls and visiting, families consulted in confidence and visiting).

There are only four families in the entire community who have had more than two changes occur—No. 34 (5 changes), No. 35 (3 changes), No. 36 (3 changes), and No. 68 (3 changes).

It is interesting to note that No. 34 has been the family evidencing the greatest degree of change in all the comparative analyses made thus far. While it is a clique leader family, its clique followers constitute a rather mobile group—some associating with it in one type of situation, and others in another. This clique leader and his clique stand in contrast to the rest of the community's families who manifest a remarkable degree of stability in their relationships as is evidenced in their relative lack of change when analyzed with reference to the different social situations.

Family No. 68 again manifested three changes in relationships. These are largely in the nature of a decrease in association—seven families indicated it to be among those they visit most frequently while five listed it as a family in whom they have complete confidence.

Generally, the comparatively limited degree of change manifested in response to this question, of such crucial importance in determining the degree of integration of the families into the community's social system and into their clique groupings, serves only to substantiate further the evidences previously mentioned of the stability of the clique groupings.

The importance of relatives in relation to the families consulted in confidence is illustrated by the fact that of the four situations analyzed thus far, the proportion of association among relatives is highest with reference to this one (77.33%). The influence of relatives is exhibited further by the fact that twenty-nine (93.55%) of the thirty-one contacts are with this group.

The amount of association among compadre relations changes little and is of relatively minor importance (5.33%).

A comparison of the two communities with reference to families consulted in confidence reveals the most marked contrast in the degree of

differences evidenced thus far in the analysis. In Atirro, the social structure still remains, in its major aspect, basically similar to that manifested in the previous sociograms. As the sociogram reveals, however, in spite of its basic similarity to the preceding Atirro sociograms, greater changes have occurred here than in any of the others. The number of changes in the lines of relationships, when compared with visiting, are greatest, and whole cliques have shifted their positions.

The number of outwardly oriented associations have increased, and particularly is it interesting to note that even the two basic prestige and clique leader families, No. 68 and No. 88, indicate that two out of the three families with whom they would consult in complete confidence live in outside settlements.

In San Juan Sur, when the social structure, as indicated from an analysis of families consulted in confidence (Figure 8), is related to those characteristic of the other type social situations, it is found to be very similar. When the lines of relationship for this sociogram are compared to that of visiting, their similarity is revealed to be greater than for any of the other sociograms by 77.67 per cent. Of the seventy-five families, 57.33 per cent evidence no change in their relationships. While in Atirro the change is greatest in relation to the comparisons made thus far (38.55%), in San Juan Sur it is the smallest (22.33%).

The differences revealed here are important. When the relationships with reference to families consulted in confidence are analyzed, there occurs considerable change in Atirro with a very significant increase in the number of families outwardly oriented, largely to relatives. In San Juan Sur, however, the change is even less than with reference to the other situations. This is no doubt partly because of the greater heterogeneity and mobility of the people living in Atirro, when compared to San Juan Sur, and, in turn, serves as a corroboration of the greater homogeneity and integration evidenced by the families living in San Juan Sur.

In Atirro it is interesting to note the clique leader family No. 88 appears to have a much more stable and integrated relationship with its clique followers, than clique leader family No. 68. In the three comparative situations the changes occuring in the relationships of No. 68 are the largest for the community. No. 88, on the other hand, appears in only one instance to have more than two changes in its relationships. Although the cliques in San Juan Sur generally evidence more stability than Atirro, a parallel situation is observed. In none of the three comparative situations was there observed more than two changes in the relationships of No. 41. The changes occurring in the relationships of clique leader No. 34, however, are the greatest for any family in the community.

When the extent to which the people are integrated into their community's social system is considered with reference to this particular social situation, it is revealed that in Atirro a significantly larger proportion of the relationships are outwardly oriented (29.19%) than in San Juan Sur (13.78%). Of the families living in Atirro, 11.67 per cent are completely outwardly oriented in this respect and 30.00 per cent are either completely or majorly dependent upon outside contact. In San Juan Sur, on the other hand, only 1.33 per cent of the families depend completely upon outside associations and only 8.00 per cent are either completely or primarily dependent upon relationships outside the community.

A comparison as to the relative importance of the various types of relationships existing within the two communities reveals that in both, the proportion of association among relatives is greater than for any other social situation thus far analyzed. They differ, however, in that in spite of the greater importance of association among relatives in this respect, in Atirro the majority of relationships are still among friends. In San Juan Sur where the major part of the associations have consistently been between relatives the percentage is even slightly higher.

The proportion of compadre relations is approximately equivalent for the two communities and remains negligible in both instances.

Borrowing patterns. An analysis of the responses of families living in Atirro to the question "Who are the families from whom you would borrow should the need arise?" reveals the social structure of the community to be basically the same as for the other types of social situations. There has occurred, however, a number of alterations in the clique groupings.

When this sociogram is compared with that for visiting patterns, it is revealed that out of the 168 relationships occurring within the community, 112 (66.67%) remained the same for the two different types of situations. There were twenty-five families who exhibited no change, and an additional twenty-two families evidencing only one variation. Of the seven families evidencing more than two changes in their relationships, six displayed three alterations each, and one, No. 68, revealed four variations.

It is of interest to note that in the analysis thus far, the clique of family No. 68 has exhibited the greatest degree of change in each situation.

It may be observed that in borrowing as in visiting, only one family in the community disturbs the isolation of the small clique composed of the hacienda owner, commissary owner, and commissary owner's father by visiting the commissary owner. The isolation of this clique with reference to borrowing is interesting in that it is the only grouping in the community that has a large number of items which could be loaned.

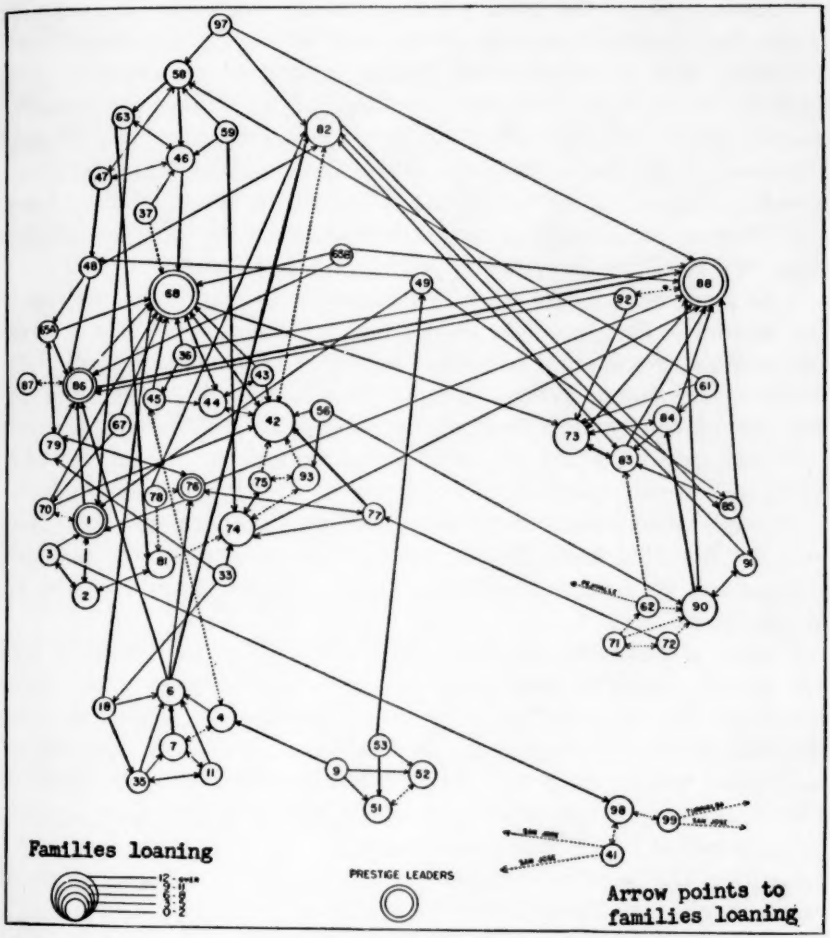

FIGURE 9
FAMILIES FROM WHOM FAMILIES BORROW IN ATIRRO, COSTA RICA

A number of the families in Atirro are sensitive about borrowing. As might be expected very little borrowing is carried on with families living outside the settlement. Of the five outside contacts, four of them are from the small clique of the hacienda owner, commissary owner, and commissary owner's father, and only one is from the peon family groups. Most of the borrowing by this group is theoretical, however, for when these families need something they usually purchase it.

An analysis of the bonds existing between those families borrowing reveal that the large majority of all such association is among friends (73.81%) with a comparatively smaller percentage of contacts among relatives (22.62%), and compadre relations (3.57%). When the borrowing associations are compared with those in relation to the other types of social situations, it becomes evident that the percentage of relationships among friends is highest and the proportion of association among relatives lowest with reference to this type of social situation, while the compadre relationships vary little from that exhibited in the other situations.

An analysis of Figure 10, with reference to the borrowing patterns of the families in San Juan Sur, reveals that a significant proportion of the relationships have changed from those evidenced consistently throughout the preceding sociograms. When a comparison is made between this sociogram and that of visiting, it is revealed that of the 206 relationships occurring within the community, 116 (53.40%) remain the same for the two situations. There were twenty-one families who displayed no changes in their relationships, while an additional thirty families exhibited only one variation. There were, on the other hand, thirteen families who evidenced more than two changes with the maximum number of variations (4) being exhibited by five of this group.

When analyzing the borrowing relationships of the families in San Juan Sur, the influence of the geographical setting of the community at once comes into focus. The family houses, as previously described, are spread out along the main ox-cart road traversing the community, and along the auxiliary trails which are connected to it. In borrowing, a large number of families do contact members of their own cliques, as is indicated by the fact that slightly over one-half of all the relationships remained the same as those evidenced for visiting. On the other hand, however, much borrowing is carried on among neighbors who may or may not be clique members.

If it is a matter of borrowing from a neighbor 200 yards away or a clique member 4 miles away, the family in San Juan Sur will more than likely borrow from its neighbor.

As a review of the sociogram will reveal, the importance of clique leader family No. 41 has decreased to some extent, with reference to borrowing, while the influence of families No. 70 and No. 34 has increased.

A number of the cliques have remained very nearly the same in their internal social structure, but their interpersonal relations with members of other cliques have brought about modifications in their positions in the social system.

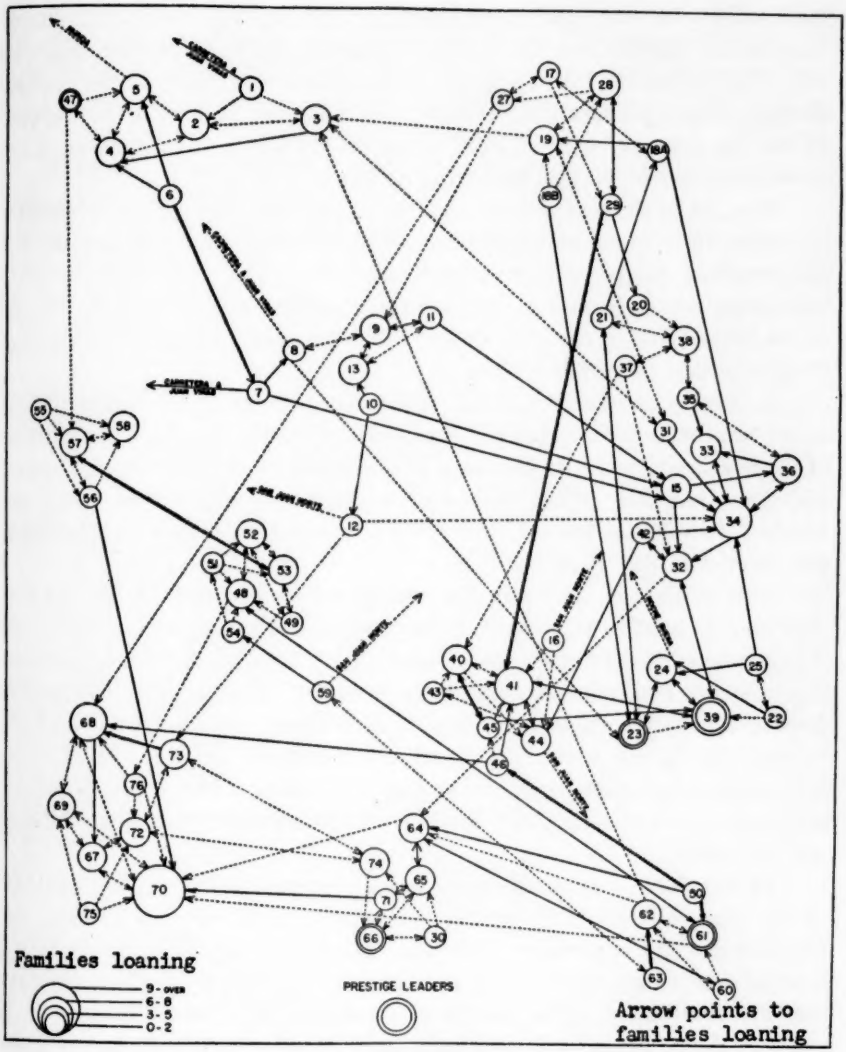

FIGURE 10

FAMILIES FROM WHOM FAMILIES BORROW IN SAN JUAN SUR, COSTA RICA

That the families are well integrated into the social structure of the community with reference to borrowing is indicated by the lack of outside contacts for this purpose. Of the 216 borrowing relationships occurring, 207 (95.83%) are among families living in the community. None of the families are primarily dependent upon others outside the community in this respect. Of the five different types of social situations analyzed, the families are least outwardly oriented in their borrowing patterns.

Here, as in the previous sociograms of San Juan Sur, the majority of all borrowing takes place among relatives (65.28%), though in comparison with the preceding, the percentage is significantly less. The proportion of friends associating with reference to the borrowing activity is greater than for any of the other types of social situation, while the compadre relationships vary little from that previously evidenced, (4.63%).

A comparative analysis of the borrowing patterns of the families living in the two communities reveals that in Atirro a significantly larger proportion of the relationships remain the same as they were for visiting when compared with San Juan Sur. While there were a number of changes in Atirro, the families generally tended to borrow more from those in their own cliques than the families in San Juan Sur.

Two significant factors in this change which occurred within the two communities relative to borrowing are geographical setting and mobility. In Atirro, where all the houses are grouped closely together facilitating borrowing from any family in the community from the standpoint of distance, the families tended largely to borrow from those other families comprising their cliques. In Atirro, where the people are generally quite sensitive about borrowing at best, there is greater hesitancy on the part of a family to borrow anything from a new neighbor family even though their houses may be only ten feet apart.

In San Juan Sur, on the other hand, although slightly more than half of the lines of relationship remain the same as they were for visiting, the factor of distance becomes predominate. The houses (families) are numbered more or less consecutively, going mainly from neighbor to neighbor throughout the community. The sociogram illustrates this consecution as it is aggregated into groups and goes from group to group in the spatial arrangement of the community. This, combined with the greater homogeneity and stability of the population are forces operating to bring about a greater degree of borrowing from neighbors.

The lack of outwardly oriented association in both communities with reference to borrowing is significant. The proportion of such outside contacts in each community is lowest for the five types of situations analyzed.

The proportion of association among relatives in both settlements is smallest when compared to the other types of social situations. Although in San Juan Sur the majority of all relationships are still among relatives, the percentage is lowest for the five situations; and in Atirro where contacts among relatives have always been in the minority, the percentage, even so, decreases to its lowest point in this situation.

Compadre relationships remain fairly constant and comparatively insignificant throughout the analysis.

BOOK REVIEW

A Primer of Sociometry. By Mary L. Northway, University of Toronto Press, 1952. Pp. vii, 48, $1.50 paper, $2.25 cloth.

It is a typical British understatement to entitle this book *A Primer of Sociometry*: it is a primer only if the term is defined as a basic contribution having such uncompromising clarity that any reader can understand and learn from it, whether or not he is familiar with the topic. This book is certain to hold the attention of many people who have never studied or worked in this area of investigation of social patterns as well as all who have. It clarifies by subtle distinctions which makes the difference between confusion and comprehension for the reader.

A Primer of Sociometry is profound, lucid, succinct: it provides penetrating analyses of masses of findings, sifting out what is crucial to understand social structure and personality and organizing well-substantiated interpretation in such fashion as to clear and chart the ground for new work. The treatment of sociometric theory, practice, and applications in research design will immensely aid faculties of schools and universities to help their students to enter gateways which may lead to important contributions. Moreover, by compactly presenting the interplay of impressive varieties of Canadian work with that done in France and the United States, *A Primer of Sociometry* provides an essential text for research teams among many countries, the most important of which would be comprised of elementary school teachers to whom health of child personality is of primary concern, side by side with social workers, psychiatrists and psychologists.

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ANNOUNCEMENTS

Moreno Institute Program, 1952-1953

The Moreno Institute is chartered by the Board of Regents of the State of New York as a non-profit institution offering post-graduate courses of instruction in sociometry, sociodrama, psychodrama, group psychotherapy.

Faculty

J. L. Moreno, M.D., Director; Robert Boguslaw, M.A., Educational Director; Edgar F. Borgatta, Ph.D.; Gerhard Schauer, M.D.; Nahum Shoobs, M.A.; Lewis Yablonsky, M.A.; Zerka T. Moreno.

Guest Lecturers: Helen H. Jennings, Ph.D.; B. W. Aginsky, Ph.D.; Henry J. Meyer, Ph.D.; Ordway Tead, LL.D.; Jacob Greenberg, Ph.D.; Joseph I. Meiers, M.D.; Henry A. Murray, M.D.; Leonard S. Cottrell, Ph.D.; Margaret Mead, Ph.D.; Lewis Mumford, Ph.D.

Registration for Spring Semester, New York Institute, 101 Park Avenue, Feb. 2-6, 4:00-9:00 p.m.; opening of Spring Semester, Feb. 9, 1953.

Beacon Workshop Program: Washington's Birthday, Feb. 21-23; Easter, April 4-6; Memorial Weekend, May 30-June 1; Independence Day, July 4-6; Labor Day, September 5-7.

An accelerated program offering clinical facilities and lecture demonstrations on a seminar basis. Students participate in clinical practice sessions, group discussions and research projects.

Each Workshop takes place at 259 Wolcott Avenue, Beacon, New York and begins at 3:00 p.m. on the first day. Room and board are included in the enrollment fee. Enrollment should be completed at least one week in advance of each conference.

Beacon Resident Training Program: July 1-September 7. An extended training program in the clinical application of sociometry, psychodrama, sociodrama, and group psychotherapy methods. This program is designed to prepare the student for professional work in the field, and is conducted under the personal direction of J. L. Moreno, M.D.

For further details, write to: Moreno Institute, Beacon, New York.

Annual Meeting, American Society of Group Psychotherapy and Psychodrama

This meeting is scheduled to be held in Los Angeles, May 4-6, at the Hotel Statler; programs will be sent out as soon as ready.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, AND CIRCULATION REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946, (Title 39, United States Code, Section 233)

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1. The names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Beacon House Inc., Beacon, New York; Editor, Edgar Borgatta, Somerville, Mass.; Managing editor, Joan H. Criswell, Washington, D. C.; Business manager, Zerka T. Moreno, Beacon, New York.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.) J. L. Moreno, Beacon, New York.

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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

J. L. MORENO, INC.

Sworn to and subscribed before me this 21st day of October, 1952.

CANIO J. SALESE

(My commission expires Mar. 30, 1954)